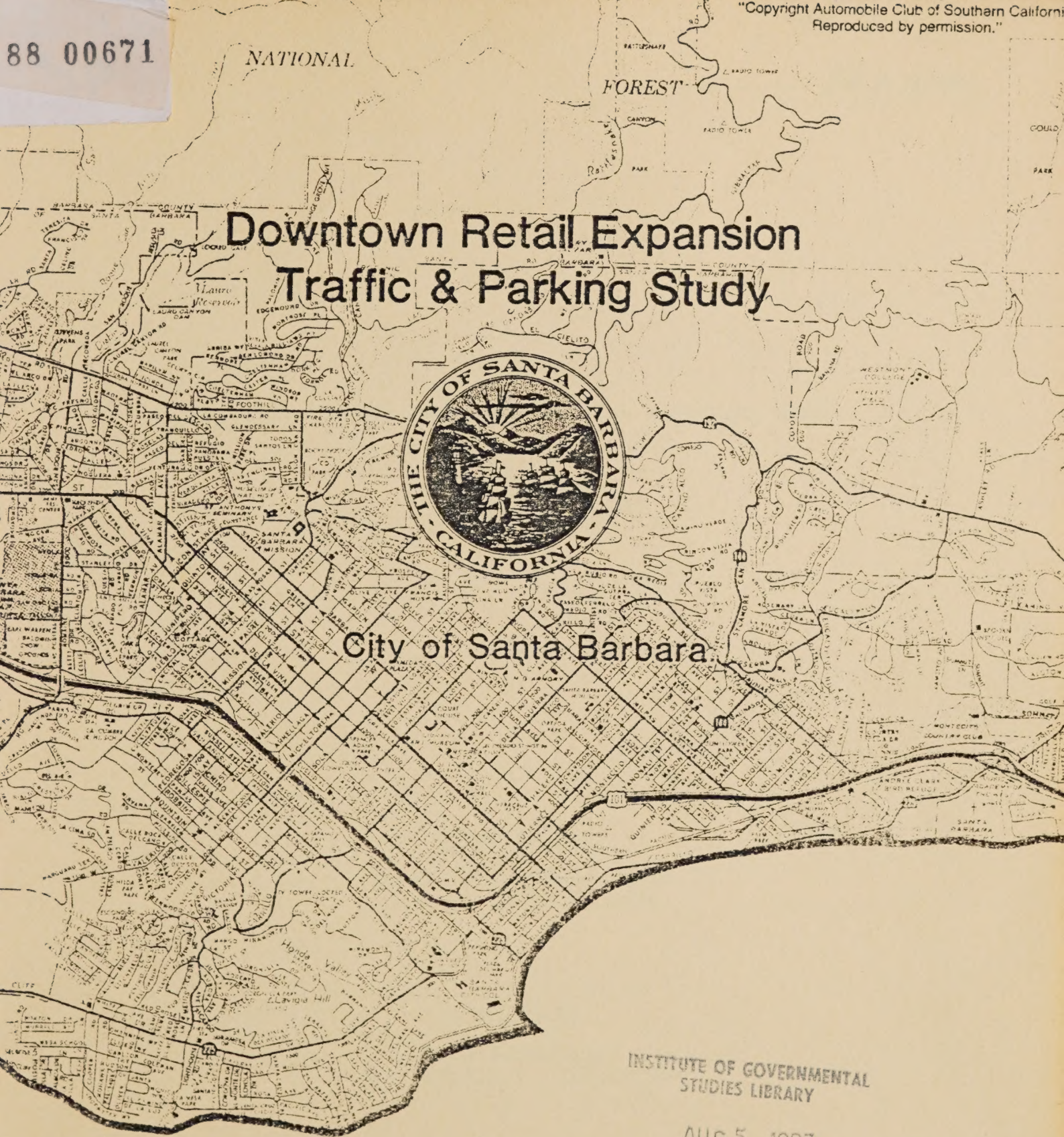
88 00671

"Copyright Automobile Club of Southern California
Reproduced by permission."



Downtown Retail Expansion Traffic & Parking Study

City of Santa Barbara

INSTITUTE OF GOVERNMENTAL
STUDIES LIBRARY

AUG 5 1987

UNIVERSITY OF CALIFORNIA

jhk & associates


Digitized by the Internet Archive
in 2025 with funding from
State of California and California State Library

https://archive.org/details/C124891635

88 0067

Downtown Retail Expansion Traffic & Parking Study

Final Report

Prepared for:

Public Works Department
City of Santa Barbara

Prepared by:

JHK & Associates
San Francisco, California

November, 1981

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	E-1
Scope of Study	E-1
Existing Traffic Conditions	E-1
Future Traffic Conditions	E-5
Recommended Traffic Improvements	E-9
Parking Conditions	E-12
Parking Improvement Strategies	E-16
1. EXISTING TRAFFIC CONDITIONS	1-1
Introduction	1-1
Levels of Service of Signalized Intersections	1-1
Travel Time/Delay Study	1-13
Summary	1-18
2. FUTURE TRAFFIC CONDITIONS	2-1
Introduction	2-1
Traffic Forecasting	2-1
Traffic Growth Due to External Traffic Growth	2-6
Traffic Growth Due to the Hotel/Conference Center and Department Stores	2-8
Level of Service for Scenarios 1 and 3	2-16
Level of Service for Scenario 4	2-23
Level of Service for Scenario 6	2-35
3. TRAFFIC IMPROVEMENT STRATEGIES	3-1
Future Conditions at Existing Signalized Intersections	3-1
Improvement Strategies Considered	3-3
Recommended Improvements and Impacts	3-5
Costs	3-15
Improvements at Non-Signalized Intersections	3-16

TABLE OF CONTENTS (continued)

		Page
4.	PARKING CONDITIONS	4-1
	Downtown Parking Districts	4-1
	Parking Supply	4-3
	Parking Enforcement	4-7
	Parking Usage and Availability	4-9
	Current Parking Needs	4-20
	Future Parking Conditions	4-37
5.	PARKING IMPROVEMENT STRATEGIES	5-1
	Parking Management Techniques	5-1
	Parking Facility Expansion	5-7
	Financing	5-14
	Expenses	5-20
	Results	5-22
APPENDIX A.	VOLUME/CAPACITY RATIOS FOR ADDITIONAL SCENARIOS	A-1
APPENDIX B.	VOLUME/CAPACITY RATIOS FOR THE AVERAGE FRIDAY PM PEAK HOUR	B-1
APPENDIX C.	RESPONSE TO COMMENTS REGARDING THE DRAFT REPORT	C-1

EXECUTIVE SUMMARY

SCOPE OF STUDY

The purpose of the Downtown Retail Expansion Traffic and Parking Study was to analyze current traffic and parking conditions in the Downtown area, project future conditions based on various development scenarios, and identify necessary improvements to accommodate the existing and projected traffic and parking demand. The study was limited to a technical analysis of these topics and did not attempt to resolve the various policy issues associated with these topics.

The study area was a 1.7 square mile area bounded by U.S. 101 to the west and south, Mission Street to the north, and either Garden, Olive or Quarantina Streets to the east (See Figure E-1). Within the study area, there are approximately 15.9 million square feet of commercial floor space. This is projected to grow by about 4% by 1985, and by about 12% by 1995. In addition, the study examined the impacts of adding three major department stores, each with 150,000 square feet of floor area, and a 240,000 square-foot hotel/conference center to Downtown. The reconstruction of the Presidio and the construction of the U.S. 101 Crosstown Freeway were also studied insofar as they will affect Downtown traffic circulation.

EXISTING TRAFFIC CONDITIONS

Intersection Level of Service

Downtown traffic conditions were analyzed primarily by determining the volume/capacity ratio and level of service at all 57 signalized intersections in the Downtown Study Area. These intersections act as the principal traffic capacity constraints and thus limit the ability of Downtown to absorb additional traffic. The level of service was calculated using the

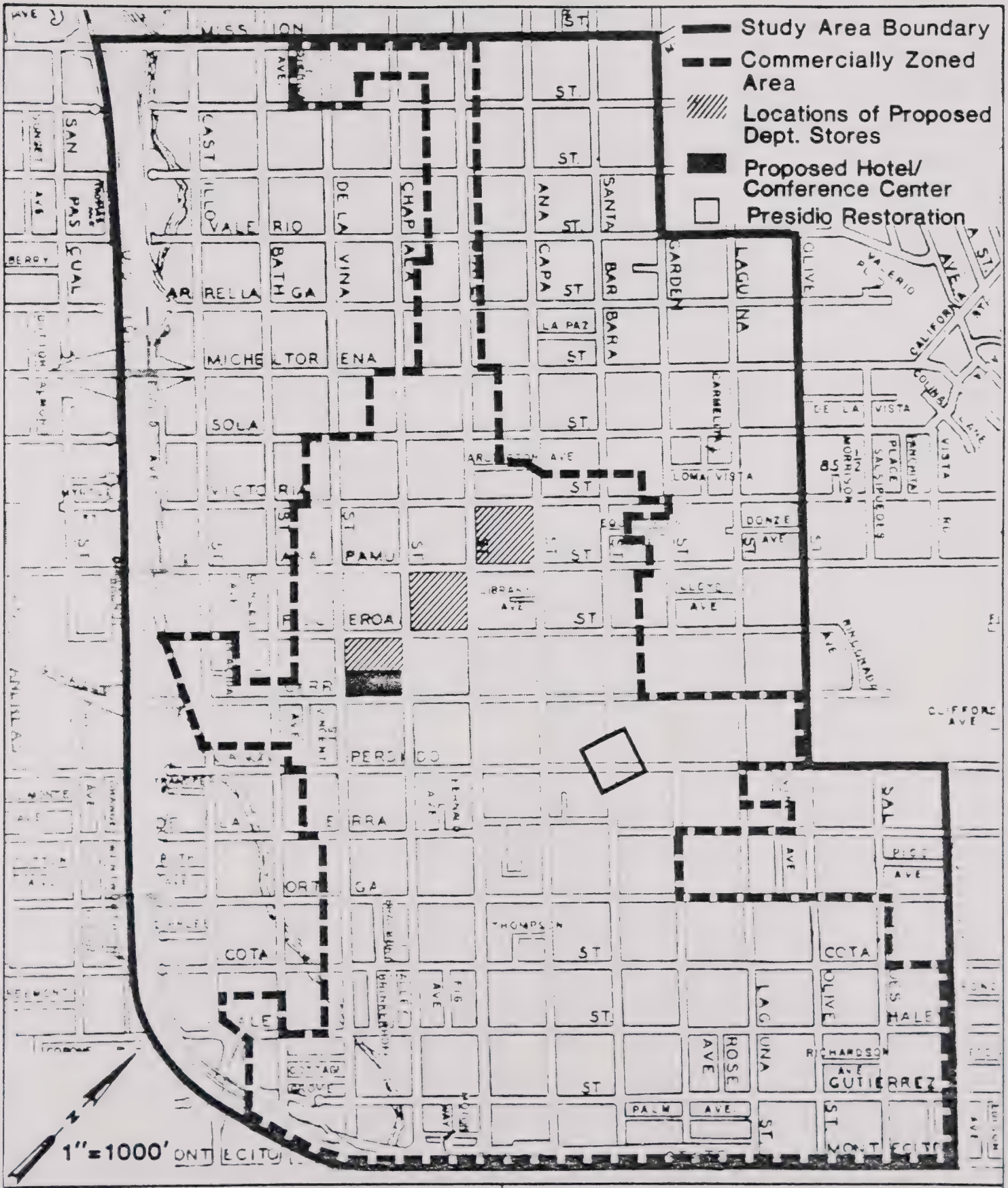
Critical Movement Analysis (CMA) procedure. Level of service is defined in terms of the volume/capacity ratio and varies from A (best) to E (worst). Level of service A is designated when the volume/capacity ratio is under 0.6 and signifies very light traffic with little or no delay. Level of service E represents the condition occurring when an intersection is accommodating the most vehicles it physically can and delays are extensive. It is defined as occurring when the volume-capacity ratio exceeds 0.9. Levels B, C and D represent intermediate conditions with increasing amounts of delay. The City's Public Works Department strives to maintain a level of service B or better during the average daily peak hour.

The existing level of service for each Downtown signalized intersection for the PM peak hour on an average weekday is shown in Figure E-2. (Calculations for average Friday peak hour conditions is contained in Appendix B). Only one intersection, Castillo and the Route 101 southbound ramps, operates at a level of service C during the average weekday peak hour. All other intersections operate at level of service A or B (41 and 15 intersections respectively). Overall traffic conditions are thus acceptable at the present time.

Travel Time/Delay Study

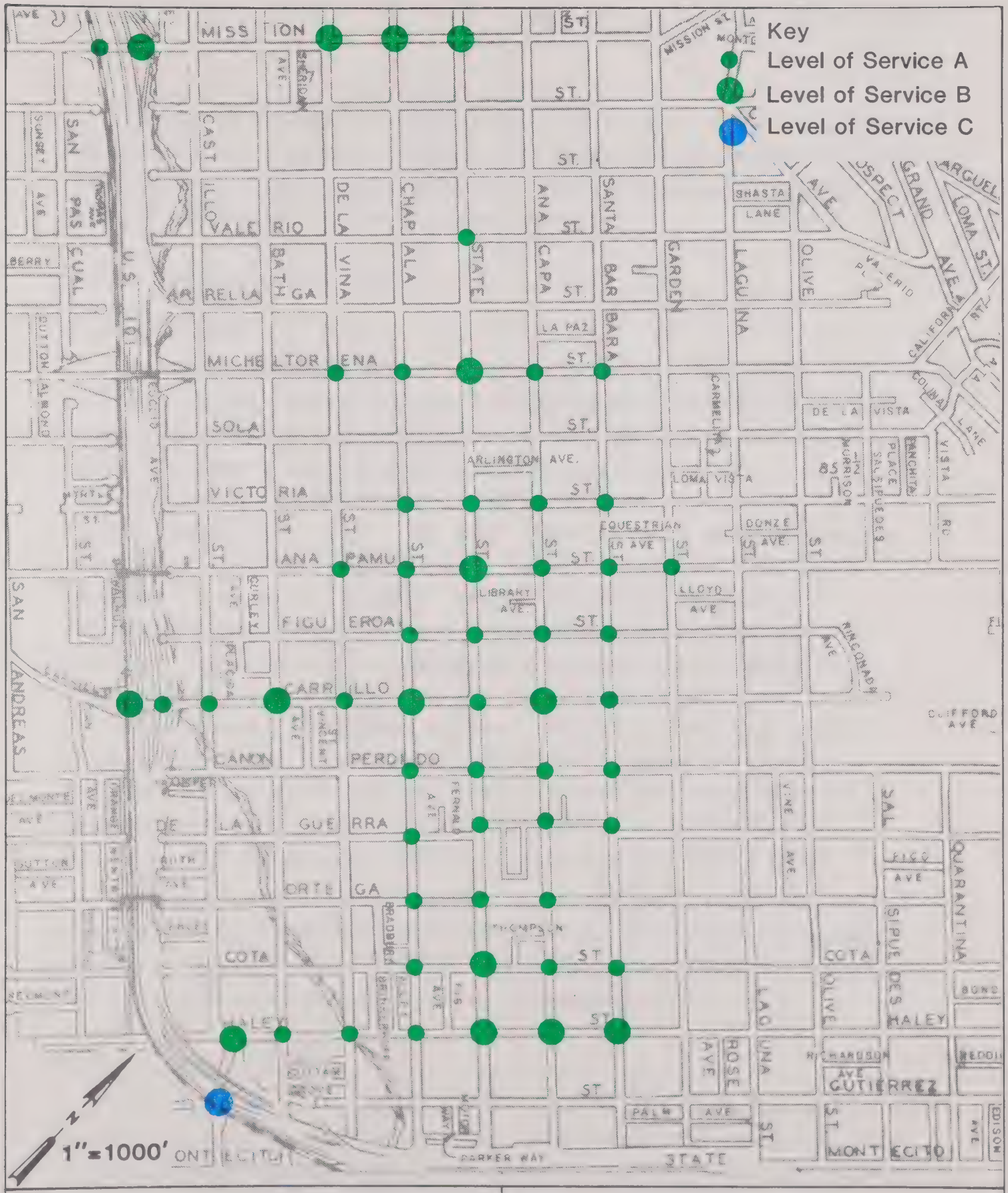
The level of service analysis was supplemented by a travel time/delay study of the four major east-west streets in the study area: Carrillo, Haley, Micheltorena and Mission Streets. Seven peak period speed runs across the Downtown Study area were made on each of these four streets in each direction. Some of the key results (average for both directions) are as follows:

Street	Between	Average Travel Speed (mph)	Average Delay/ Run (Seconds)	Average Delay/ Signalized Intersection (seconds)
Carrillo	101 SB & Olive	12.9	113	13
Haley	Castillo & Quarantina	14.8	91	14
Micheltornea	Castillo & Olive	14.4	64	10
Mission	101 SB & Garden	13.2	71	11



jhk & associates

Figure E-1
Downtown Study Area



jhk & associates

Figure E-2
1981 Level of Service

Thus, on average, a motorist only incurs from one to two minutes delay in crossing Downtown. These results further support the conclusion that there presently isn't excessive delay due to traffic congestion in the Downtown area.

FUTURE TRAFFIC CONDITIONS

Traffic Growth

Traffic growth in Downtown Santa Barbara will result from three factors. First, there will be traffic growth due to the projected general increase in Downtown floor space (excluding the proposed hotel/conference center and department stores). This is expected to increase Downtown traffic in 1985 by between 3.1% to 4.3% relative to 1981. By 1995, the increase will be between 9.3% and 12.6% over 1981 levels. Second, there will be an increase in external traffic, which includes trips passing through the Downtown area, and trips from outside Downtown to Downtown. The underlying assumption is that this traffic will grow due to regional economic and population growth even if no new Downtown development occurs. Growth in external traffic is expected to increase overall Downtown traffic by 4.0% by 1985, and by 12.9% by 1995. Thus, these two factors will increase Downtown traffic fairly uniformly, with the growth relative to 1981 averaging 7.6% in 1985 and 23.7% in 1995.

Finally, the construction of the hotel/conference center and the opening of three new department stores will further increase traffic. However, this traffic would be concentrated on selected streets leading to and from these developments.

Major Street Changes

The impacts of the closing of Santa Barbara and Canon Perdido Streets at the Presidio and the construction of the U.S. 101 Crosstown Freeway were also examined. While these projects will not significantly change the amount of travel to and from

Downtown, they will result in different travel patterns than presently exist. Congestion will thus worsen on many streets and improve on others.

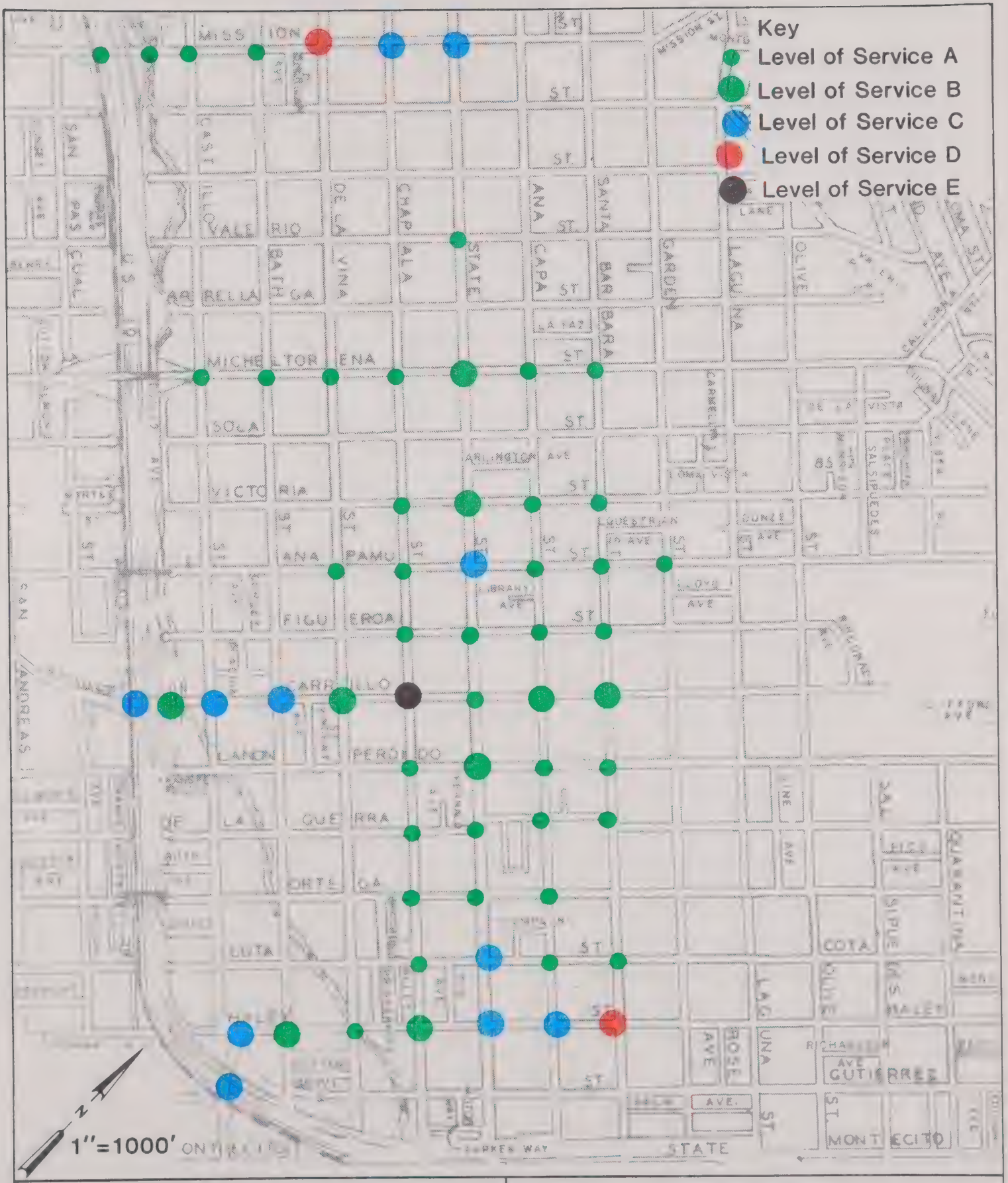
Level of Service

Level of service analysis was done for all Downtown signalized intersections for the years 1985 and 1995, based on the projected traffic levels. Four intersections where signals will soon be installed were also included in the analysis. In 1985, assuming construction of the hotel/conference center and the three department stores, fifteen intersections will operate at a level of service C or worse during the average daily peak hour. Figure E-3 shows the predicted level of service at each intersection. Two of these intersections would operate at level D, and one would operate at level E. By 1995, there would be 23 intersections operating at level C or worse. The Presidio reconstruction and the U.S. 101 freeway project will not increase the number of intersections that operate at level C or worse. However, several bad intersections would get worse, such that there would be as many as eighteen intersections operating at levels of service D or E. (Figure E-4). The following table summarizes the results of each scenario, assuming no traffic improvement measures are implemented:

Number of Signalized Intersections With Each Level of Service					
Level of Service	1981	1985[1]	1995 w/o Presidio, w/o Freeway[1]	1995 w/Presidio, w/o Freeway[1,2]	1995 w/Presidio w/Freeway[1,2]
A	41	37	24	24	26
B	15	9	14	13	12
C	1	12	7	5	6
D	0	2	11	11	8
E	0	1	5	7	8
Total	57	61	61	60	60

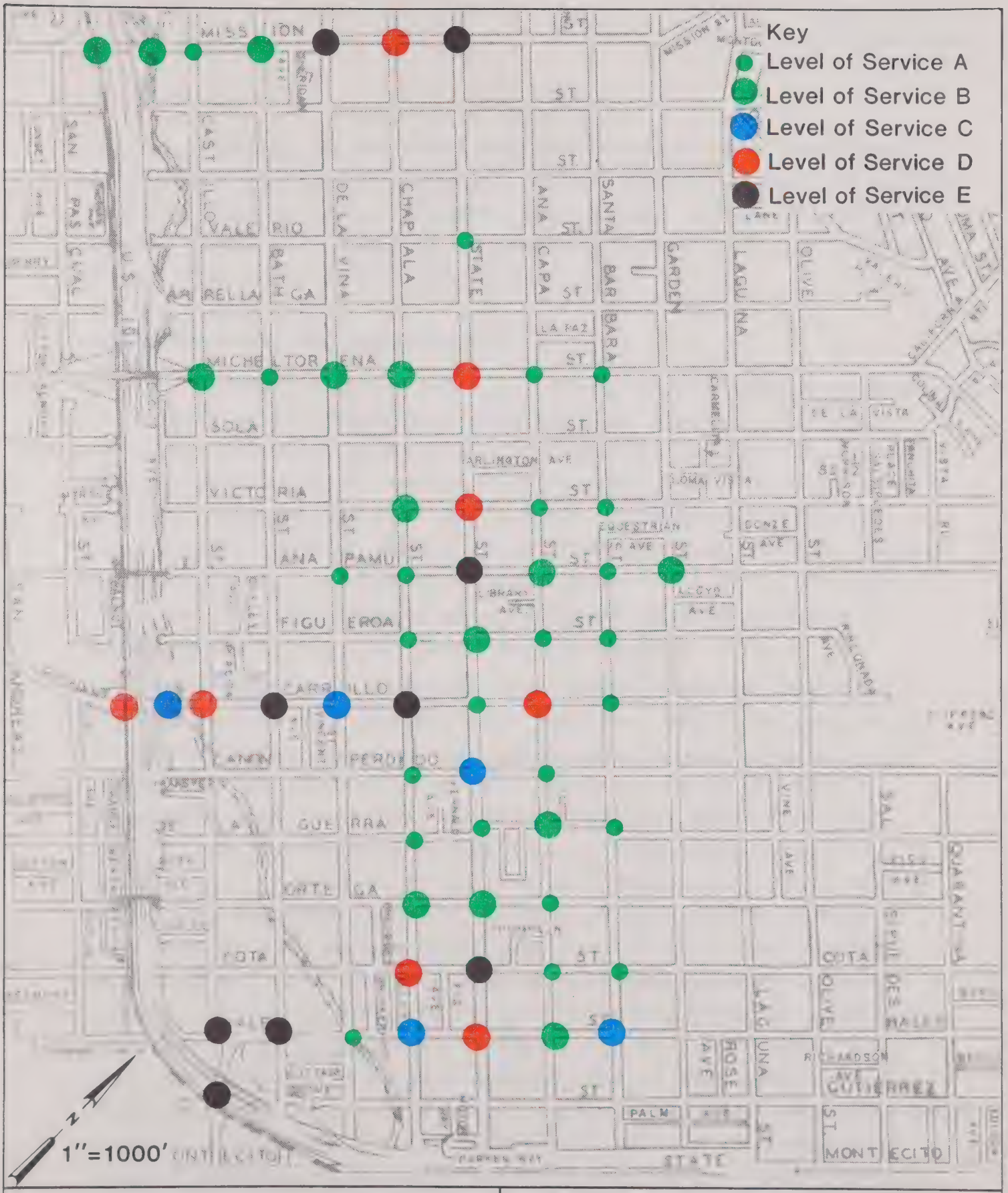
[1]Includes four intersections to be signalized in 1982.

[2]Excludes intersection of Santa Barbara and Canon Perdido streets where the Presidio will be restored.



jhk & associates

Figure E-3
1985 Level of Service
(with Dept. Stores
and Hotel/Conference Center)



jhk & associates

Figure E-4
1995 Level of Service
(with Presidio & Freeway)

In addition to the increased congestion at existing signalized intersections, the closing of Santa Barbara Street due to the Presidio restoration will cause much traffic to divert to Garden Street. This will result in extensive congestion on portions of Garden Street in the northbound direction.

RECOMMENDED TRAFFIC IMPROVEMENTS

As shown in Figures E-3 and E-4 most of the projected congestion will occur on intersections involving four streets: Mission, Carrillo, Haley and State Street. In developing strategies to improve future traffic conditions, low-cost localized improvements to traffic operations were emphasized. Recommended strategies are primarily parking removal, lane configuration changes, signal phasing changes, and roadway widenings which cause little disruption. Major roadway widening projects which require extensive right-of-way acquisition were not considered.

Strategies to reduce vehicular demand, such as improved transit service and ridesharing incentives, were also considered in the analysis. However, the overwhelming majority of trips to, from, and within Downtown are made by automobile. Thus, extremely large increases in transit usage, carpooling, bicycling, and walking must be achieved before a major reduction of traffic is achieved. A program to achieve such reductions would require major auto disincentives such as the establishment of tight restrictions on commuter parking in the Downtown area and the establishment of free peripheral parking and expanded transit service. However, the cost of such a program would be extremely high and the effect on traffic flow would be small relative to what can be achieved through focused traffic improvements at congested locations. This latter approach has thus been emphasized, with the understanding that substantial efforts to encourage transit use, bicycling and ridsharing are ongoing, and that these efforts assist in reducing the rate of future traffic growth.

The recommended improvements at signalized intersections, excluding changes in lane striping and signing, are shown in Figure E-5. These changes are proposed for dealing with the worst future condition analyzed for each particular intersection. The major recommendations include the following:

- Eliminate parking on Haley and Mission Streets so that two lanes can be provided in each direction
- Widen Mission Street by four feet so that 10-foot lanes can be provided
- Widen Castillo Street between Haley and Montecito Street so that turning lanes onto U.S. 101 can be provided
- Widen Carrillo Street under U.S. 101 in order to provide three westbound through lanes and a left-turn lane
- Widen U.S. 101 off-ramps at Carrillo and Castillo Streets to three lanes
- Remove parking on various intersection approaches to provide an additional approach lane
- Install left-turn signal phases at Carrillo/101 SB, Castillo/101 SB, Chapala/Haley and Haley/Bath. Change signal phasing at Carrillo/Chapala
- Prohibit left-turns from westbound Carrillo onto Anacapa
- Make Chapala one-way northbound starting at Canon Perdido rather than Carrillo.

The above changes will substantially improve traffic flow, and the level of service at 15 intersections that would otherwise operate at level of service C or worse would operate at level A or B. At nine other intersections, however, there was no feasible way to improve the intersection's operation to a level of service B without causing major disruption through street widening.

In addition, if Santa Barbara Street is closed because of the Presidio Restoration, it will be necessary to remove parking from the east side of Garden Street between Haley and Carrillo

jhk & associates

Figure E-5
Proposed Traffic Improvements

Street and install two northbound traffic lanes. Traffic signals will also probably have to be installed at most Garden Street intersections between Gutierrez and Micheltorena Streets. Other intersections where new traffic signals will probably be required include all of the intersections on De La Vina between Micheltorena and Canon Perdido Streets, and the Sola and Gutierrez Street intersections with Chapala, State, Anacapa and Santa Barbara Streets. Altogether, around 20 new signals will probably be required by 1995, costing around $1,000,000 (current dollars). The various traffic improvement tactics discussed earlier are estimated to cost $495,000.

PARKING CONDITIONS

Parking Supply

There are approximately 16,807 parking spaces in the Downtown study area including 1621 public off-street spaces, 7526 private off-street spaces, and 7660 on-street spaces. Within the core commercial area,[1] there are 7055 spaces, of which roughly half are private off-street spaces, a quarter are public lots for monthly short-term parking, and a quarter are on-street spaces, predominately having 90-minute time limits. Within this core area, there is thus very little public all-day parking available. However, several private lots on the edge of the core area allow monthly parking at rates that generally range between $30 and $35 per month.

Parking Demand

Parking demand in the core area, especially for all-day parking, is very high and exceeds the supply of parking in many

[1] 40 square block area centered on Carrillo and State Streets and bounded by Micheltorena, Santa Barbara, Haley and De La Vina Streets.

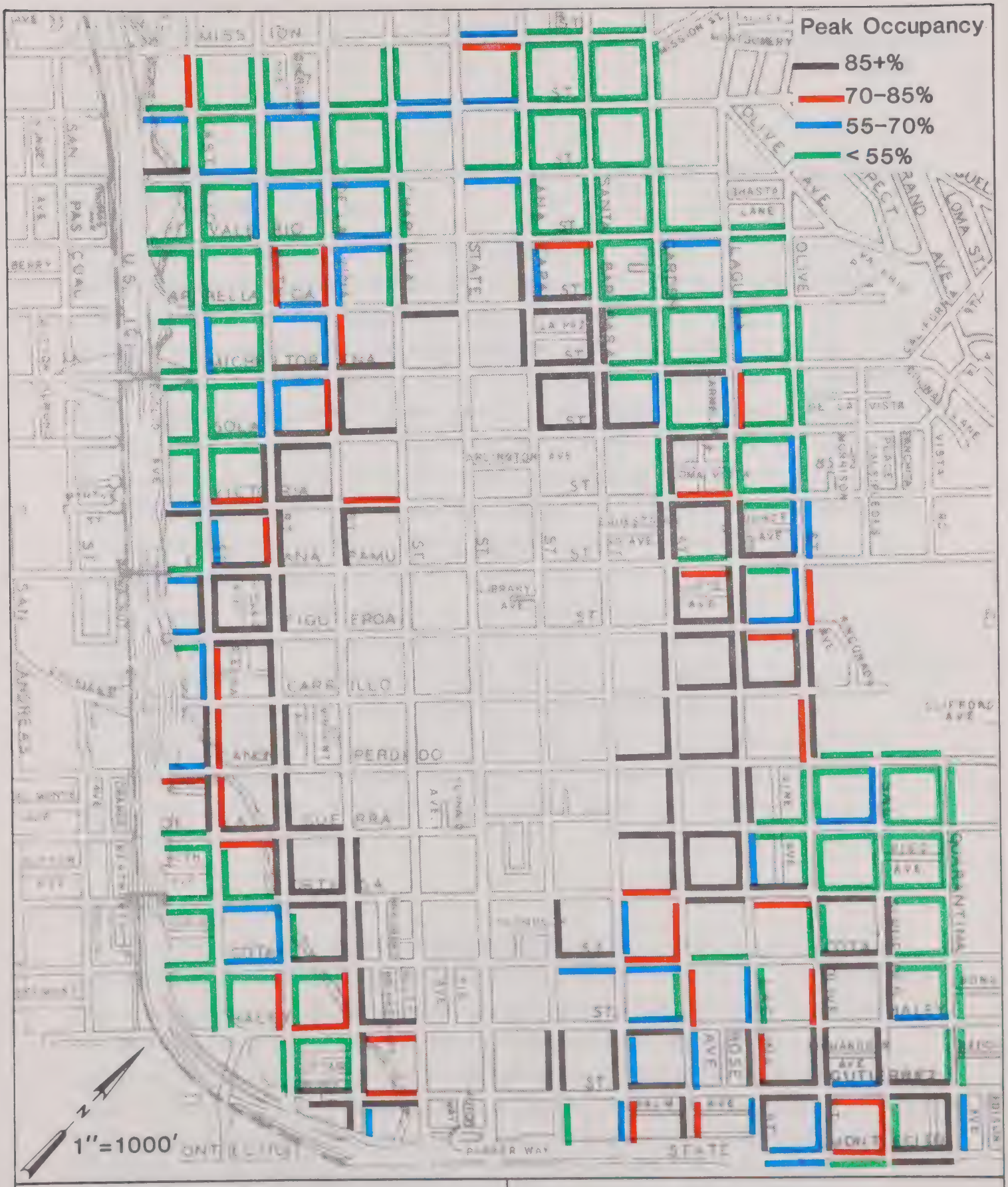
locations. In the nine major Parking District facilities (excluding Parking Facility #10, which is located several blocks south of the Downtown center), about 93% of the spaces are occupied during the peak early afternoon period. Six of the nine lots are completely filled and have queues of cars waiting to enter. Usage of the 90-minute curb spaces is less intense but is also quite high in many locations. There is also extremely heavy usage of the on-street spaces just outside the core commerical area where all-day parking is permitted. There is a 2 to 3 block area surrounding the central area where practically every available space is occupied by Downtown employees' cars. Most of these streets are in residential areas. Figure E-6, which shows parking occupancy on blocks with unrestricted parking, indicates the approximate boundaries of this intrusion.

Perceptions of the Problem

A mail survey of Downtown businesses was conducted for this study in April 1981. This survey confirmed the field study results which showed that there was a greater need for more all-day employee parking than for short-term customer parking. Sixty-one percent of the businesses responding said that the availability of employee parking was "very inadequate," compared to 22% saying so regarding customer and visitor parking. The survey also found that employees walked an average of 2.5 blocks (1/4 mile) from their cars to work, while customers and visitors walked only 0.8 blocks. Most people felt that more than a two-block walk was unacceptable.

Assessment of Current Needs

Two methods of calculating parking needs based on field data were followed. The first technique compared peak occupancy data with an assumed capacity of each parking facility, taken to be 70% for residential streets, 85% for commercial streets, and 90% for public off-street parking. Using this method, there is an



jhk & associates

Figure E-6
Curb Parking Occupancy
On Blocks with Unrestricted Parking

estimated shortage of around 700 spaces, of which about two-thirds are for all-day parking.

A second technique was to compare the amount of commercial floor space to the amount of available parking in the Downtown area. Data from central Business Districts of other cities suggest that about 2.0 parking spaces are required for every 1000 square feet of retail floor space with office and industrial uses requiring somewhat less parking per unit of floor space. However, in the areas of Downtown with commercial uses, there is an average of only 1.36 parking spaces per 1000 square feet of "retail-equivalent" floor space (which includes factored amounts of non-retail commercial floor space that reflect the lower parking needs associated with non-retail uses). In the entire study area, there are about 1.7 spaces/1000square feet. In order to provide two spaces per 1000 square feet of retail floor space, about 2500 additional parking spaces would have to be provided. The magnitude of the calculated shortage relative to the shortfall estimated from the occupancy data suggests that there is a great unfulfilled latent demand for parking, and that if additional parking were provided, more cars and people would be attracted to Downtown.

Future Parking Needs

Projected growth in Downtown commercial activity is not expected to significantly change the Downtown parking situation for two reasons. First, much of the growth will occur outside of the Parking District where any additional development must provide sufficient parking in conformance with the City's zoning code. Second, major developments in the Parking Districts are likely to provide their own parking because of the commercial advantage offered by dedicated parking. Also, the assessment credits achieved from providing parking greatly offset the cost of providing the parking.

PARKING IMPROVEMENT STRATEGIES

Parking Management Techniques

Several management strategies to improve the existing parking situation were evaluated. All of these actions can be implemented quickly and inexpensively. The most promising strategy is to eliminate the 90-minute restriction on those blocks where there is currently very little short-term demand, and allow all-day parkers to use these spaces. This will provide additional parking for employees while not adversely affecting the short-term parking situation since the spaces affected are not heavily used. However, it may arouse opposition on some blocks where the residents prefer the 90-minute restriction. Increased enforcement of short-term parking regulations is also recommended, especially if the number of short-term curb spaces is reduced.

Parking Facility Expansion

There is the need for additional short-term parking in the central core area of Downtown Santa Barbara, and at least one multi-level structure should be built on the Parking District's surface lots west of State Street. Parking Lots #2, #3, and #4 are the most promising sites. Adding an additional level to one of these lots would cost from $1.0 to $1.4 million and would add between 120 170 short-term parking spaces per level.

Short-term parking demand must be met by providing parking close to people's destinations. Otherwise, shoppers will drive to outlying shopping malls where more convenient parking is available. However, the excess employee demand may be dealt with through several different options. Basically, employees can be allowed to continue to park in adjacent residential areas, fringe parking facilities with or without shuttle bus service can be provided, and additional parking in the core area itself can be provided. Some combination of these options is of course

possible, and the need for each will be greatly affected by whether a residential permit parking program is implemented in the areas surrounding the Downtown core, as has been proposed in recent years.

If such a program is adopted, there will be a greatly increased need for additional long-term parking. Part of this need can be mitigated by selling a limited number of special parking permits to employees. This would reduce the amount of new parking that must be provided, while permitting the City to still control the level of usage and encroachment in residential areas. With a residential parking permit program, a peripheral parking lot/shuttle bus system is also a viable option for handling employee parking demand. Without the residential permit program, however, such a system, even if free, would have little usage because of its perceived inconvenience relative to parking in adjacent residential areas.

A second policy decision that must be made is to what extent the Parking District (and the businesses which support it) are willing to subsidize the cost of employee parking. The full monthly cost incurred by the District in providing a new parking space is estimated to be nearly $100/month. If the full cost is charged to users or even the present $60/month, one would expect few new purchasers. At lower rates, however, there will be increasingly more demand for these spaces and the net cost to the Parking District would increase dramatically. Thus, the amount of additional parking needed, as well as the cost incurred by the Parking District, depends upon the rate set for all-day parking.

Financing

The study includes a detailed analysis of the Parking District's financial position for undertaking a major expansion. The results show that at the current assessment rates, the District's revenues will exceed expenses over the next ten years,

which combined with the sizable capital improvement reserve that already exists, places the District in an excellent position for undertaking major expansion projects.

After accounting for currently programmed capital improvement projects, it is estimated that the District will accumulate an unrestricted capital improvement reserve of $8.6 million by 1990 (about $3.7 million in 1981 dollars since a 10% inflation rate was assumed). This would pay for the construction (amortized) and maintenance of about 500 additional parking spaces in new structures built over existing parking lots. After 1990, the District's income rises sharply because the first of two outstanding bonds matures at that time. The District's ability to continue to adequately finance the expansion through the 1990's is thus assured.

1. EXISTING TRAFFIC CONDITIONS

INTRODUCTION

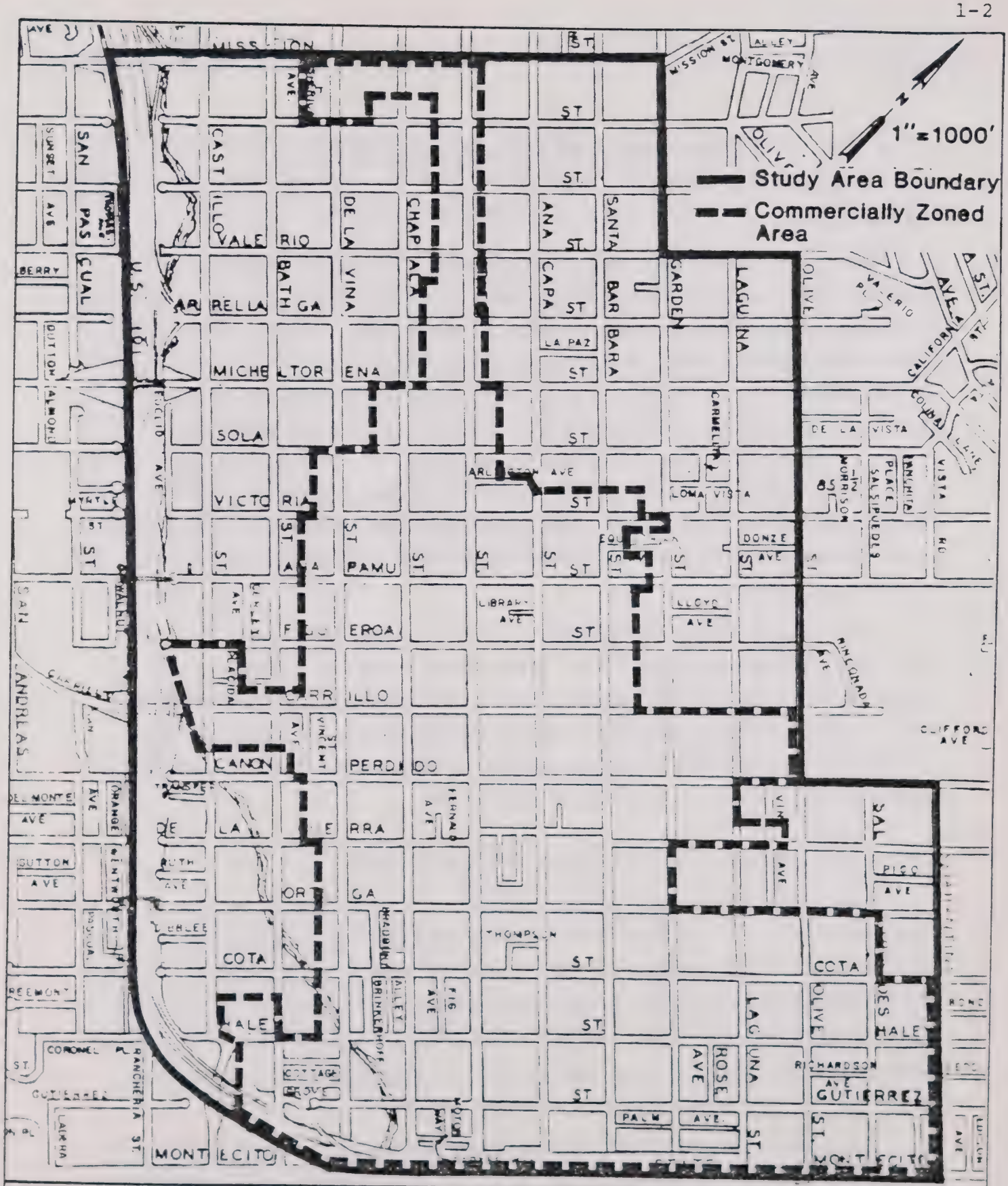
The purpose of the Downtown Retail Expansion Traffic and Parking Study was to analyze current traffic and parking conditions in the Downtown area, project future conditions based on various development scenarios, and identify necessary improvements to accommodate the existing and projected traffic and parking demand. The study area was a 1.7 square mile area bounded by U.S. 101 to the west and south, Mission Street to the north, and either Garden, Olive or Quarantina Streets to the east (See Figure 1). The study area includes the Downtown commercial area centered on State and Carrillo Street and surrounding residential areas.

This first chapter documents existing traffic conditions and consists of two sections. The first section examines the level of service at all signalized intersections in the Downtown study area. The second section discusses travel time and delay on the four major east-west streets in the study area: Carrillo, Micheltorena, Mission and Haley Streets.

LEVELS OF SERVICE OF SIGNALIZED INTERSECTIONS

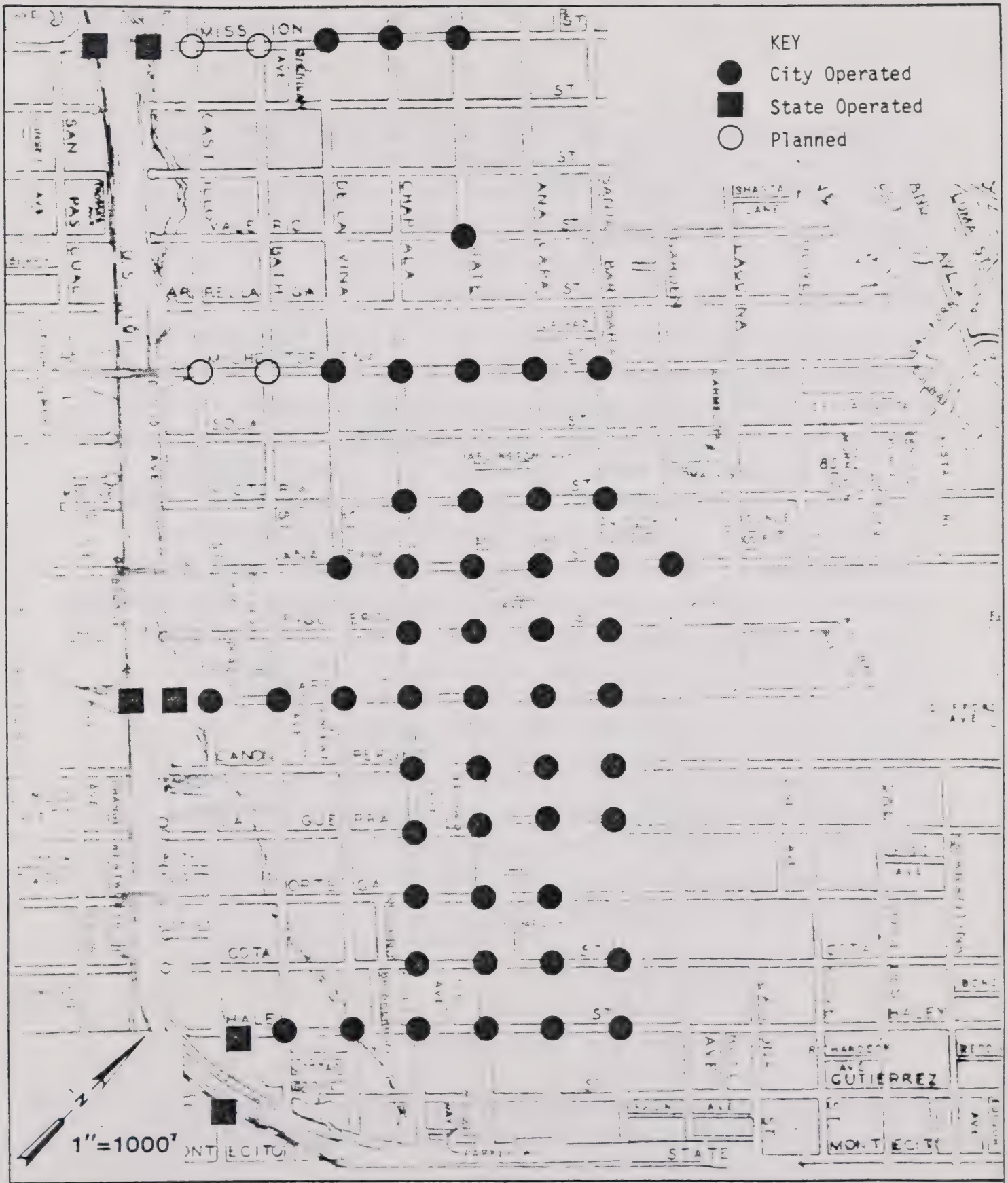
There are currently 57 signalized intersections in the Downtown study area, and four other intersections are scheduled to become signalized during fiscal year 1981-82 (See Figure 2). Of the 57 existing signalized intersections, six are traffic-actuated signals adjacent to U.S. 101 and operated by CALTRANS. Five of these signals have 2-phase operation; the Haley/Castillo signal has a left-turn phase for northbound traffic.

The remaining 51 signals are fixed-time signals operated by the City of Santa Barbara on a 60-second cycle. All operate in a simple two-phase pattern except for the Carrillo-Chapala



jhk & associates

Figure 1
Downtown Study Area



jhk & associates

Figure 2
Signalized Intersections

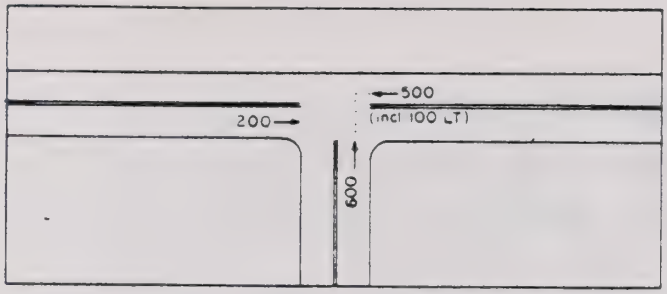
intersection which has a left-turn phase for eastbound traffic. In late 1981 or 1982, new controllers will be installed in these signals, which will increase their capabilities in terms of additional phasing and traffic actuation.

Methodology

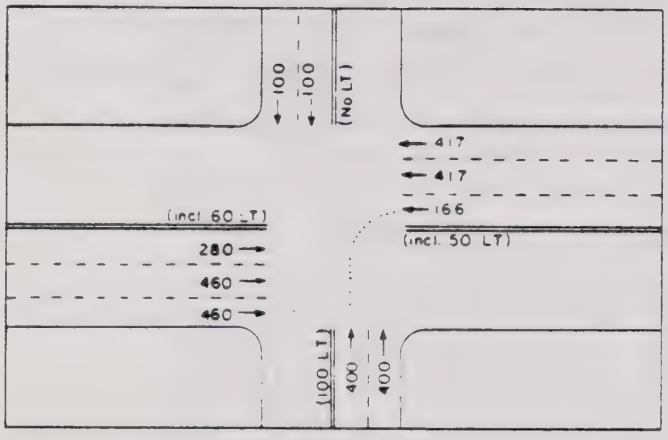
The peak hour level of service for each of the existing 57 signalized intersections has been calculated using the Critical Movement Analysis (CMA) procedure. The CMA procedure calculates overall level of service for the intersection by considering the intersection as a whole operating unit. The underlying theory behind the procedure is that at any intersection, there is a combination of conflicting traffic movements which must be accommodated. The critical movements are those conflicting movements with the highest volumes. Figure 3 shows three examples of such critical movement combinations. On a per-lane-basis, the sum of the traffic volumes on these critical movements cannot physically exceed around 1800 passenger cars per hour of green time (i.e. one car every 2 seconds).

In actuality the 1800 passenger cars per lane per hour is seldom realized because of various factors which reduce capacity. In a typical urban situation a critical lane capacity of 1500 vehicles per hour occurs. The most important of these factors which reduce capacity are:

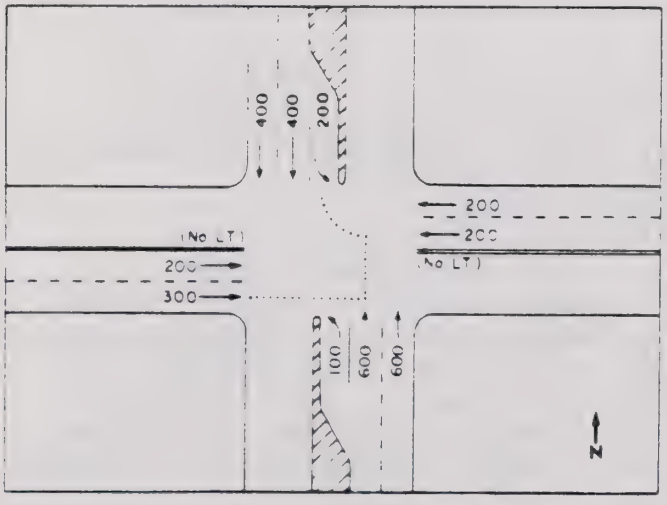
1. Lane width
2. Buses and trucks
3. Bus stop operations
4. Left turns
5. Right turns and pedestrian activity
6. Peaking characteristics (peak hour factors)
7. Clearance time



- Single Lane Approaches
- Two Phase Signal
- Critical Movements:
  500 and 600 vph
- Sum of Critical Volumes:
  500 + 600 = 1100 vph



- Two and Three Lane Approaches
- Two Phase Signal
- Critical Movements, by lane:
  400 and 460 + 50 vph
- Sum of Critical Volumes:
  400 + 510 = 910 vph



- Two and Three Lane Approaches
- Five Phase Actuated Signal
- Note:
  For the east-west street, the critical volume is 300 vph. For the north-south street the greatest demand for green time will occur with the conflicting movement totaling 800 vph (600 + 200 LT). The conflicting movement totaling 500 vph (400 + 100 LT) would require less green time and will be satisfied if the 800 vph critical volume is satisfied.
- Sum of Critical Volumes:
  300 + 800 = 1100 vph.

Source: Interim Materials on Highway Capacity; Transportation Research Circular #212 (Transportation Research Board, Washington, D.C., January, 1980)

jhk & associates

Figure 3
Examples of Critical Movements

The CMA procedure used to analyze intersection level of service in Santa Barbara is based on the "Planning Application" procedure contained in the Interim Materials on Highway Capacity Transportation Research Circular #212, published by the Transportation Research Board in January 1980. This procedure uses a critical lane capacity of 1500 vehicles per hour for two-phase signals, and 1425 vehicles per hour for 3-phase signals. Level of service is then related to the critical lane volume/capacity ratio as follows:

Level of Service	Maximum Volume/Capacity Ratio
A	.60
B	.70
C	.80
D	.90
E	1.00

The meaning of the different levels of service have been defined in the 1965 Highway Capacity Manual.

- At level of service A there are no loaded cycles (i.e., the load factor[1] is 0.0) and few are even close to loaded (when an entire green phase is utilized continuously by cars). No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically the approach appears quite open, turning movements are easily made, and nearly all drivers find freedom of operation, their only concern being the chance that the light will be red, or turn red, when they approach.

- Level of service B represents stable operation, with a load factor of not over 0.1; an occasional approach

[1] The load factor is the proportion of green signal intervals in a given time period that are fully utilized by traffic. A loaded cycle occurs when all cars queued at an intersection cannot clear the intersection before the signal changes back to the red phase.

phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel somewhat restricted within platoons of vehicles. Under typical rural conditions this frequently will be suitable operation for rural design purposes.

- In level of service C stable operation continues. Loading is still intermittent, but more frequent, with the load factor ranging from 0.1 to 0.3. Occasionally drivers may have to wait through more than one red signal indication, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so. In the absence of local conditions dictating otherwise, this is the level typically associated with urban design practice.

- Level of service D encompasses a zone of increasing restriction approaching instability in the limit when the load factor reaches 0.70. Delays to approaching vehicles may be substantial during short peaks within the peak period, but enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive back-ups.

- Capacity occurs at level of service E. It represents the most vehicles that any particular intersection approach can accommodate. Although theoretically a load factor of 1.0 would represent capacity, in practice full utilization of every cycle is seldom attained, no matter how great the demand, unless the street is highly friction-free. A load factor range of 0.7 to 1.0 is more realistic. At capacity there may be long queues of vehicles waiting upstream of the intersection and delays may be great (up to several signal cycles).

In the research currently being done to develop an improved highway capacity manual, an effort is being made to expand these definitions by defining level of service in terms of vehicle delay rather than only load factor. Preliminary results, published in Transportation Research Circular 212, suggest the following approximate relationship between level of service and delay. Actual delays are greatly influenced by signal cycle length and signal timing progression, as well as level of service.

Level of Service	Average delay (seconds) per vehicle entering intersection from all approaches
A	0-16
B	16-22
C	22-28
D	28-35
E	Over 35

To calculate intersection level of service using the CMA Planning Application procedure, the only required input data are the lane geometry and permitted movements for each approach, the hourly traffic volumes and turning movements, and the signal phasing. The lane geometry, permitted movements and signal phasing were determined from field inspections. Traffic volume and turning movement data were supplied by the City of Santa Barbara's Public Works Department. The traffic volume data are representative of average weekday peak hour conditions. Actual peak conditions, such as are likely to occur on Fridays during the Christmas shopping season, can be expected to have considerably higher traffic volumes.

The traffic volume data used are also raw unadjusted data derived from actual field measurements taken on many different days. As a result, one can easily find small inconsistencies in traffic volumes from block to block. The Public Works Department intends to eventually adjust these data in order to eliminate such inconsistencies.

Results

The results of the critical movement analyses for each intersection is summarized in Table 1 and shown graphically in Figure 4. During the peak hour, one intersection operates at level of service C, fifteen intersections operate at level

Table 1

EXISTING AVERAGE WEEKDAY PM PEAK HOUR LEVELS OF SERVICE

Intersection	Volume/ Capacity Ratio	Level of Service*
Anacapa/Anapamu	.49	A
Anacapa/Canon Perdido	.48	A
Anacapa/Carrillo	.61	B
Anacapa/Cota	.45	A
Anacapa/De La Guerra	.49	A
Anacapa/Figueroa	.31	A
Anacapa/Haley	.62	B
Anacapa/Micheltorena	.32	A
Anacapa/Ortega	.36	A
Anacapa/Victoria	.37	A
Anapamu/Chapala	.35	A
Anapamu/De La Vina	.34	A
Anapamu/Garden	.43	A
Anapamu/Santa Barbara	.51	A
Anapamu/State	.65	B
Bath/Carrillo	.68	B
Bath/Haley	.48	A
Canon Perdido/Chapala	.37	A
Canon Perdido/Santa Barbara	.45	A
Canon Perdido/State	.54	A
Carrillo/101 NB	.59	A
Carrillo/101 SB	.64	B
Carrillo/Castillo	.53	A
Carrillo/Chapala	.66	B
Carrillo/De La Vina	.46	A
Carrillo/Santa Barbara	.58	A
Carrillo/State	.39	A
Castillo/101 SB	.71	C
Castillo/Haley	.64	B
Chapala/Cota	.60	A
Chapala/De La Guerra	.29	A
Chapala/Figueroa	.31	A
Chapala/Haley	.55	A
Chapala/Micheltorena	.46	A
Chapala/Mission	.64	B

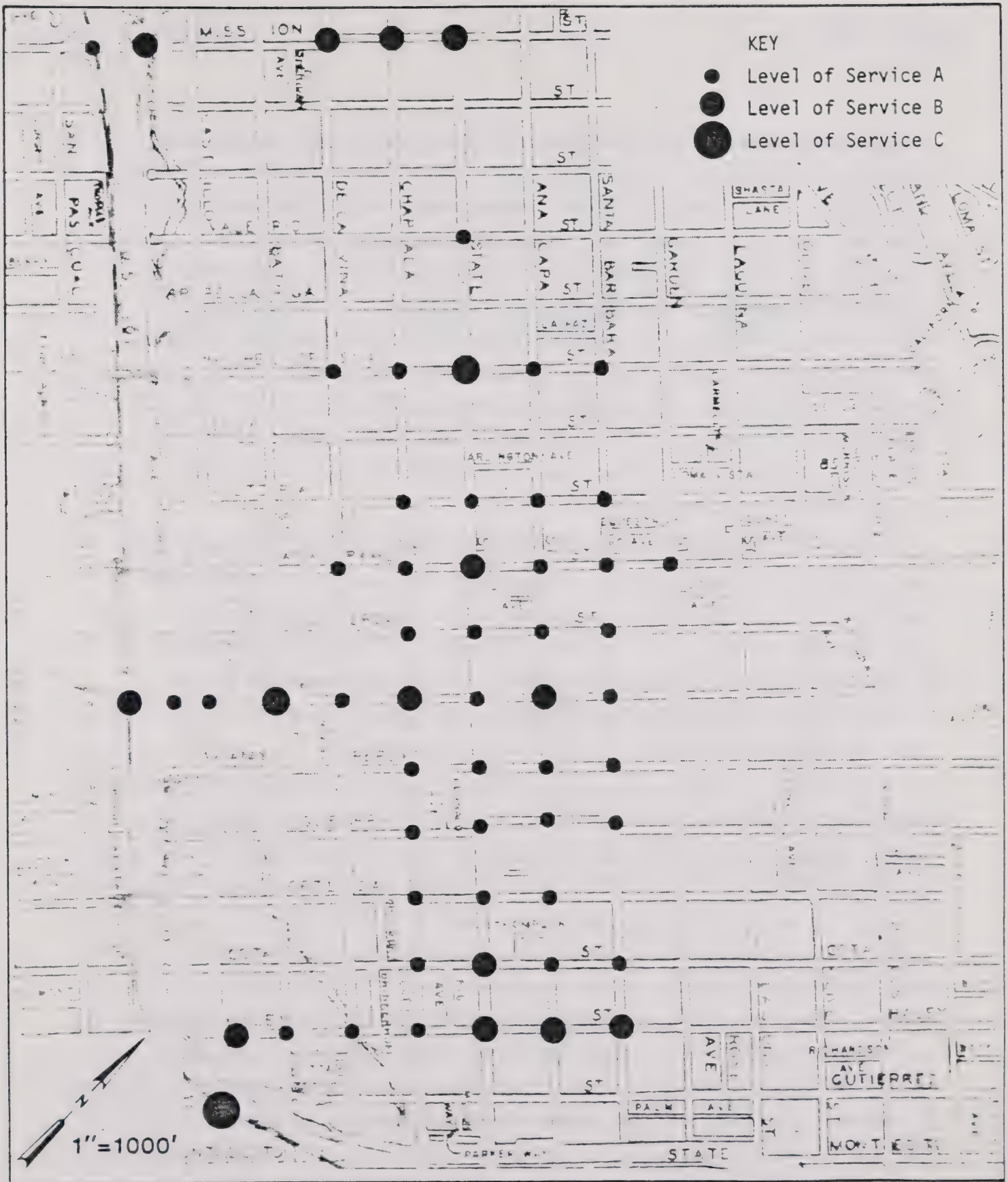
Table 1 (continued)

EXISTING AVERAGE WEEKDAY PM PEAK HOUR LEVELS OF SERVICE

Intersection	Volume/ Capacity Ratio	Level of Service*
Chapala/Ortega	.44	A
Chapala/Victoria	.40	A
Cota/Santa Barbara	.50	A
Cota/State	.69	B
De La Guerra/Santa Barbara	.42	A
De La Guerra/State	.35	A
De La Vina/Haley	.42	A
De La Vina/Micheltorena	.48	A
De La Vina/Mission	.67	B
Figueroa/Santa Barbara	.35	A
Figueroa/State	.41	A
Haley/Santa Barbara	.69	B
Haley/State	.67	B
Micheltorena/Santa Barbara	.50	A
Micheltorena/State	.60	B
Mission/101 NB	.61	B
Mission/101 SB	.53	A
Mission/State	.68	B
Ortega/State	.45	A
Santa Barbara/Victoria	.37	A
State/Valerio	.44	A
State/Victoria	.58	A

*Relation between Level of Service and V/C Ratio is:

V/C Ratio	Level of Service
Less than .60	A
.60 - .70	B
.70 - .80	C
.80 - .90	D
Greater than .90	E



jhk & associates

Figure 4
Average Weekday PM
Peak Hour Level of Service

of service B, and the remaining 41 intersections operate at level of service A. The critical movement method of analysis generates an overall level of service for the intersection. When the signal phasing is timed proportionally to the critical volumes, or when the signal is traffic-actuated, the overall level of service is applicable to the critical movements, while the non-critical movements or approaches would operate at a higher (better) level of service. For example, on a two-way street with unbalanced flow, the heavier (critical) approach traffic would operate at the intersection level of service, while the lighter approach traffic would operate at a higher level of service.

With fixed-time signals, which comprise the overwhelming majority of signals in Downtown Santa Barbara, the level of service for an approach might be worse than that indicated by the CMA results if a signal is poorly timed. To check this possibility, the actual peak hour signal splits were compared to what would be theoretically best according to the CMA results.

In general, the actual splits correspond closely to the theoretical splits, but there are several cases in which the major street, which already gets the longer green phase, should get a still longer green phase. In some of these cases, the timing is determined by the time needed for a pedestrian to cross the major street rather than traffic considerations. The green phases are most often shorter than ideal on State Street, Chapala Street, and Anacapa Street. However, few of the disparaties in signal timing significantly affect the level of service calculation. Altogether, about a dozen individual intersections approaches operate at a level of service that is one level worse than is indicated for the overall intersection.

In addition to the calculation of overall level of service, individual intersections were checked to determine if left-

turning vehicles would have trouble making their turns because of excessive opposing traffic. The following four intersection approaches have left-turn bottlenecks during the peak hours because the left-turn volumes exceed capacity:

Street & Approach	Left turn onto	Hourly Left-turn Volume	Capacity
Carrillo WB	Anacapa	130	120
Carrillo EB	Santa Barbara	273	260
Carrillo WB	101	188	152
Castillo SB	101	164	120

At these intersections, installation of left-turn phases should be considered.

TRAVEL TIME/DELAY STUDY

In order to examine conditions on Carrillo, Haley, Micheltorena and Mission Streets in greater detail, peak period speed runs across the entire study area were done on these streets. On Thursday and Friday, April 30 and May 1, 1981, seven speed runs were made in each direction on Carrillo, Haley and Mission Streets. Micheltorena speed runs were done on Thursday, June 4, 1981. The results of these studies are shown in Tables 2 and 3 and discussed in the following sections.

In general, average travel speed on each street was fairly consistent at between 13 and 15 miles per hour, and delay accounted for between 20 and 40% of total travel time. In most cases, dealy at signalized intersections (including runs without stops) averaged under 22 seconds. This is typical for levels of service A and B.[1] Intersections with average delays greater than this were:

[1] Interim Materials on Highway Capacity; Transpportation Circular 212 (January 1980), page 12.

Table 2

SUMMARY RESULTS OF DOWNTOWN SPEED RUNS (seven runs/street direction)

Street & Direction	Number of Intersections				Distance (feet)	Travel Time (sec)		Avg. Speed (mph)	Avg. # of Stops/ Run	% of Signals with Stop	Avg. Delay/Run (sec)	Avg. Delay/ Signal (sec)	Delay/ Travel Time
	Total	Signal	Stop	Uncontrolled		Mean	S.D.						
Carrillo Street	(4/30/81; 4:30-5:40 PM)												
Eastbound	11	8	2	1	5270	278	40	12.9	5.6	45%	112	13	.40
Westbound	11	9	1	1	5270	281	86	12.8	4.7	41%	113	12	.40
Haley Street	(5/1/81/ 3:30-4:45 PM)												
Eastbound	11	6	0	5	5810	281	31	14.1	4.6	77%	110	18	.39
Westbound	11	7	0	4	5810	256	47	15.5	3.7	53%	71	10	.28
Mission Street	(4/30/81/ 3:30-4:30 PM)												
Eastbound	9	4	5	0	4360	240	18	12.4	6.9	48%	81	14	.34
Westbound	9	5	4	0	4360	214	16	13.9	6.6	52%	60	8	.28
Micheltorena Street	(6/4/81/ 4:30-5:30 PM)												
Eastbound	9	5	2	2	4750	205	35	15.8	4.3	43%	44	6	.21
Westbound	9	5	3	1	4750	249	28	13.0	6.9	78%	84	14	.34

Note: Number of signalized, stop-sign controlled and uncontrolled intersections are not the same in both directions because the speed run would start from the middle of the first intersection in the study area and would therefore not be included in the speed run. Thus, the eastbound and westbound speed runs include a different set of intersections.

Table 3

INDIVIDUAL INTERSECTION DELAYS
(All times in seconds)

	EASTBOUND			WESTBOUND		
Cross Street	# of Stops	Avg. Delay/ Stop	Avg. Delay/ Run	# of Stops	Avg. Delay/ Stop	Avg. Delay/ Run
CARRILLO STREET:						
101 SB[1]	-	-	-	3	21	9
101 NB[1]	3	18	8	3	12	5
Castillo[1]	0	0	0	3	9	4
Bath[1]	2	18	5	4	22	12
De La Vina[1]	0	0	0	3	16	7
Chapala[1]	2	39	11	2	30	9
State[1]	5	31	22	0	0	0
Anacapa[1]	7	30	30	6	63	54
Santa Barbara[1]	6	34	29	2	31	9
Garden[2]	7	4	4	7	4	4
Laguna	0	0	0	0	0	0
Olive[2]	7	3	3	-	-	-
HALEY STREET:						
Castillo[1]	-	-	-	4	26	15
Bath[1]	3	13	6	2	8	2
De La Vina[1]	3	12	5	2	16	4
Chapala[1]	6	22	19	0	0	0
State[1]	7	29	29	6	25	21
Anacapa[1]	7	36	36	5	18	13
Santa Barbara[1]	6	18	15	7	16	16
Garden	0	0	0	0	0	0
Laguna	0	0	0	0	0	0
Olive	0	0	0	0	0	0
Salsipuedes	0	0	0	0	0	0
Quarantina	0	0	0	-	-	-

[1] Signal

[2] Stop Sign

Table 3 (continued)

Cross Street	EASTBOUND			WESTBOUND		
	Stops	Avg. Delay/ Stop	Avg. Delay/ Run	# of Stops	Avg. Delay/ Stop	Avg. Delay/ Run
MICHELTORENA STREET:						
Castillo[2]	-	-	-	7	5	5
Bath[2]	7	3	3	7	5	5
De La Vina[1]	4	20	11	3	30	13
Chapala[1]	3	26	11	7	10	10
State[1]	4	10	6	7	15	15
Anacapa[1]	4	6	4	7	20	20
Santa Barbara[1]	0	0	0	3	28	12
Garden[2]	7	8	8	7	4	4
Laguna	1	5	1	0	0	0
Olive	0	0	0	-	-	-
MISSION STREET:						
101 SB[1]	-	-	-	4	13	8
101 NB[1]	1	12	2	1	10	1
Castillo[2]	7	5	5	7	5	5
Bath[2]	7	9	9	7	9	9
De La Vina[1]	3	28	12	5	18	13
Chapala[1]	2	11	3	3	14	6
State[1]	7	38	38	5	16	11
Anacapa[2]	7	3	3	7	3	3
Santa Barbara[2]	7	5	5	7	4	4
Garden[2]	7	4	4	-	-	-

[1]Signal

[2]Stop Sign

Street	Direction	Intersection	Average Delay (sec)
Carrillo	WB	Anacapa	54
Mission	EB	State	38
Haley	EB	Anacapa	36
Haley	EB	State	29
Carrillo	EB	Santa Barbara	29

Carrillo Street

Travel speed on Carrillo Street averaged 12.9 mph eastbound and 12.8 mph westbound. In both directions, about 40% of the total travel time was due to signal delay. On average, delay was incurred at 45% and 41% of the signalized intersections in the eastbound and westbound directions respectively. Stops were consistently required eastbound at State, Anacapa and Santa Barbara and westbound at Anacapa, where a very long average delay of 54 seconds occurred.

Haley Street

Haley Street had fairly high average travel speeds (14.1 and 15.5 mph) but this was largely due to there being several intersections with no signals or stop signs in the segment studied. Stops were required at 77% and 53% of the signals in the eastbound and westbound direction respectively, the highest percentages of the four streets considered thus far. Eastbound delay was consistently incurred at Chapala, State, Anacapa and Santa Barbara. Westbound, delay was very likely to occur at Santa Barbara, Anacapa, and State.

Micheltorena Street

Eastbound Micheltorena travel speed was the highest of any street, averaging 15.8 miles per hour. Less delay was also incurred relative to other streets. Westbound travel

speed was slower because delay occurred at 78% of the signals encountered. Stops were consistently required at Anacapa, State and Chapala Streets.

Mission Street

Mission Street travel speed averaged around 13 mph, and delay accounted for 34% and 28% of the eastbound and westbound travel time. Delays were incurred at 43% and 51% of the signals going eastbound and westbound. About a third of the total delay in each direction was due to stop signs. Eastbound, consistently long delays were incurred at State Street. Westbound, short delays consistently were incurred at State and De La Vina.

SUMMARY

The results generated and discussed in the previous sections suggest that existing traffic conditions in Downtown Santa Barbara are relatively good. Of the 57 signalized intersections studied, and which present the greatest potential bottleneck locations, only the Castillo/101 5B intersection was found to be operating during the peak hour at level of service C, the level typically associated with urban design practice. All of the remaining intersections operated at superior levels of service A or B. The travel time studies confirmed these results in that delays incurred were modest. Of the 49 signalized intersection approaches covered (26 intersections), average delay exceeded 22 seconds in only five cases. Of the 56 speed runs, there were only five cases when more than one red phase had to be waited through at an intersection. These were at State Street (twice eastbound on Haley and once eastbound on Mission) and Anacapa (once westbound on Carrillo and once eastbound on Haley).

2. FUTURE TRAFFIC CONDITIONS

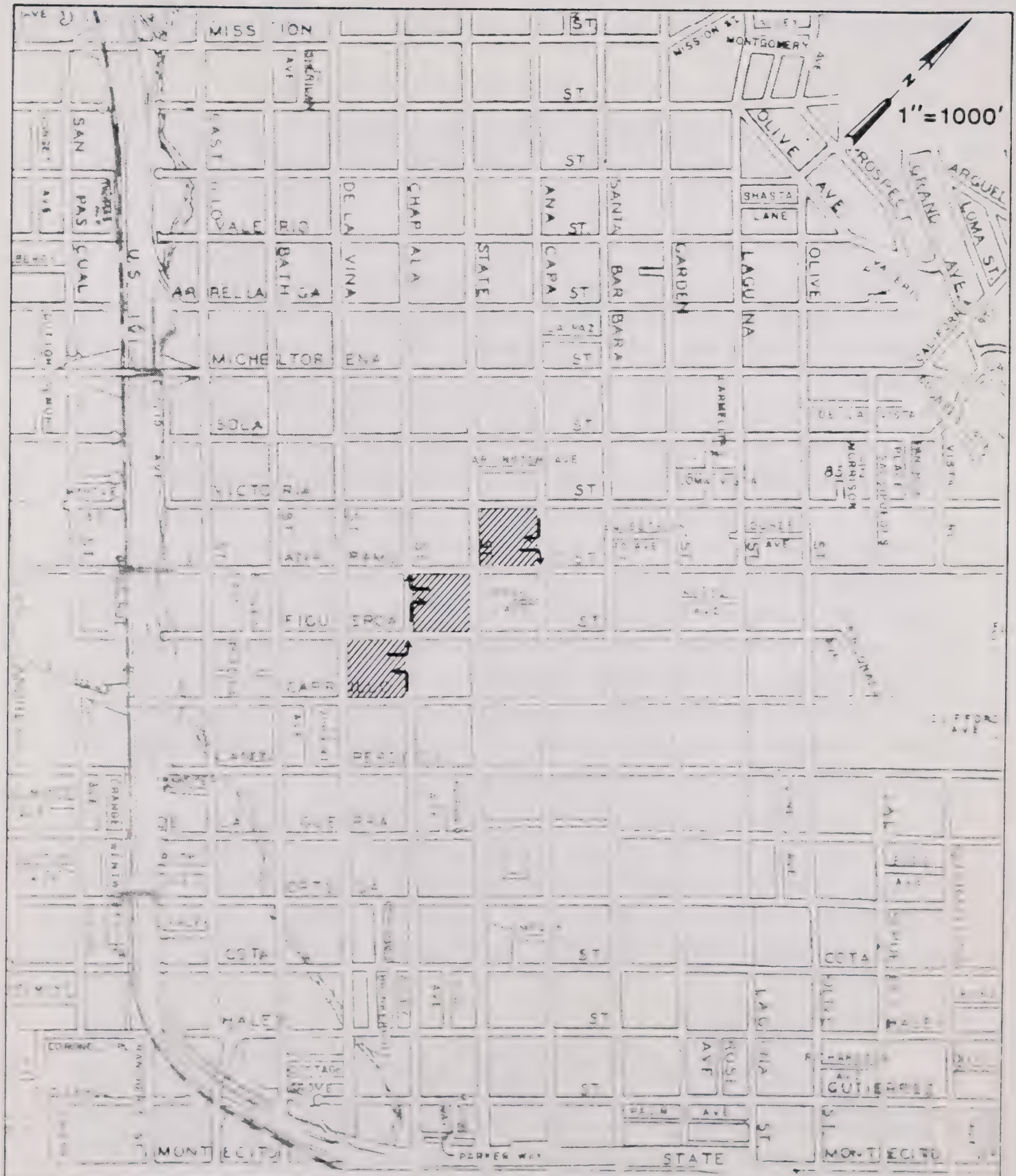
INTRODUCTION

This chapter examines traffic conditions in the years 1985 and 1995. By 1985, three new department stores, each with 150,000 square feet, are expected to be built in the center of Downtown. The most likely locations are shown in Figure 5. In addition, a 240,000 square-foot hotel/conference center will be built on the north side of Carrillo Street between De La Vina and Chapala Streets, and there will be an approximately 4% increase in Downtown commercial floor space in addition to the department stores and hotel/conference center (Scenario 1). By 1995, an additional 8% increase in Downtown commercial floor space is predicted, and the Presidio would be restored as a museum at Santa Barbara and Canon Perdido Streets. Three sets of 1995 conditions are examined in this chapter: one that includes completion of the Presidio project and the U.S. 101 Crosstown Freeway (Scenario 6), and two that are based on the existing U.S. 101 alignment, with and without the Presidio project (Scenario 3 and 4).

This chapter contains four additional major sections. The first section describes the methodology used to forecast future traffic levels. The remaining major section discusses the levels of service which will result from these future traffic levels under different development scenarios.

TRAFFIC FORECASTING

Traffic growth in Downtown Santa Barbara will result from three factors. First, there will be growth in traffic due to the general increase in Downtown commercial activity (excluding the hotel/conference center and the three department stores). Since the projected growth in Downtown development



jhk & associates

Figure 5
Locations of Proposed Department Stores & Assumed Auto Access Routes

is expected to occur relatively uniformly over the commercially-zoned Downtown area, a reasonable assumption is that this will cause an equally uniform growth in Downtown traffic. The second factor affecting future traffic is an increase in external traffic, which includes trips passing through the Downtown area and trips from outside Downtown to Downtown. The underlying assumption is that this traffic will grow slowly due to regional economic and population growth even if Downtown development is static. As with the traffic growth due to future Downtown development, this growth is assumed to occur over the entire Downtown street network.

Finally, these will be increased traffic due to the four major development projects contemplated for Downtown: the hotel/conference center and the three department stores. These projects, by being major concentrated developments, would attract new trips that do not conform to existing traffic patterns. Rather, the additional traffic resulting from these projects would be concentrated on certain streets leading to and from the project sites. Additional traffic caused by the restoration of the Presidio would be very minor, especially after considering the displacement of existing businesses in the area.[1] Presidio trip generation was thus ignored, although the impact of closing Santa Barbara Street due to the Presidio was carefully considered.

Traffic Growth Due to Projected Downtown Build-Out (Excluding the Hotel/Conference Center and Department Stores)

The City of Santa Barbara Community Development Department has estimated current (1980) and projected (1985 and 1995)

---

[1] Approximately 1100 daily trips to and from the Presidio were estimated, but buildings to be demolished currently generate an estimated 750 daily trips. The difference of 350 trips (30-35 per hour) is insignificant. —

commercial floor space in the Downtown study area, plus a small area north of the study area that includes Cottage Hospital. These estimates are as follows:

Floor Space ('000's of square feet)

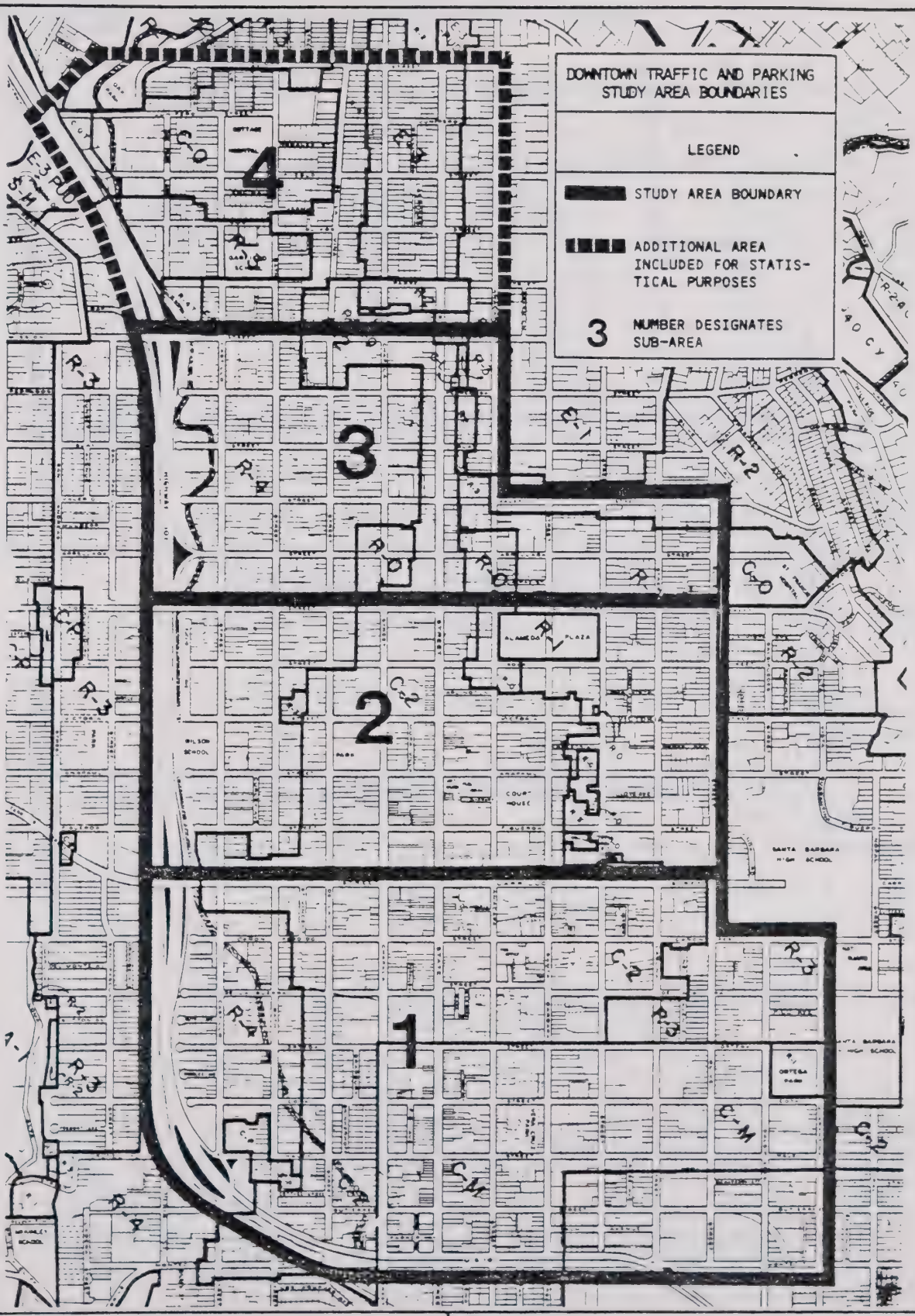
Year	Retail	Office	Industrial	Hotel/Motel	Institutional	Total
1980	5,662	3,310	2,085	424	4,368	15,885
1985	5,867	3,675	2,150	429	4,371	16,492
1995	6,277	4,405	2,280	437	4,376	17,776

The total commercial floor space in 1985 represents an increase of 3.82% over 1980, and the 1995 level is an increase of 11.90% over 1980. In making these estimates, the Downtown area was divided into four subareas, shown in Figure 6. The projected increase in development varied by subarea, ranging from a 2.30% increase in total floor space by 1985 in subarea 4, to a 5.89% increase in area 3.

In order to convert the projected increases in commercial floor space usage to projected increases in traffic, it was first necessary to weigh the different types of commercial uses relative to their impacts on traffic. For example, equal increases in the amount of retail and office floor space will not generate equal traffic increases since retail use generates much more traffic per unit of floor space. Thus, in each subarea, the amounts of non-retail floor space were multiplied by factors to account for these differences in traffic generations. This then resulted in a total amount of "retail-equivalent" floor space in each subarea for 1980, 1985 and 1995.

The factors used for this conversion were derived after examining trip generation rates recommended for different land uses by the Institute of Transportation Engineers and Caltrans. The factors selected were:

Retail:	1.0
Office:	0.3
Industrial:	0.15
Hotel/Motel:	0.3
Institutional:	0.3



jhk & associates

Figure 6
Subareas for Projecting
Downtown Growth

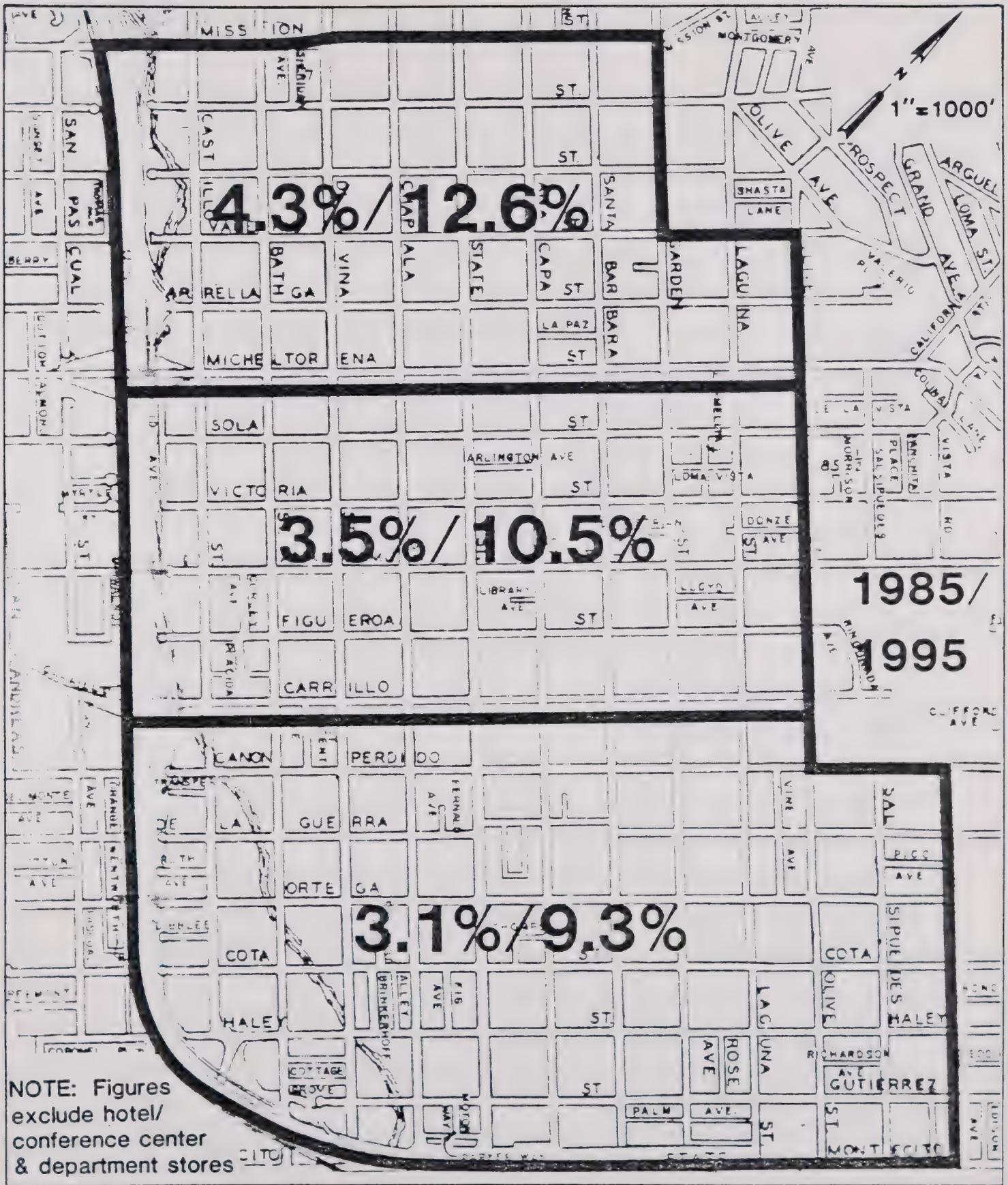
These factors were multiplied by the actual number of square feet of floor space in each category to obtain the following amounts of "retail-equivalent" floor space in thousands of square feet:

Subarea	1980	1985	%Increase	1995	%Increase
1	4,868	5,043	3.59%	5,393	10.78%
2	2,198	2,285	3.96%	2,459	11.90%
3	533	565	6.03%	629	18.09%
4	807	839	3.96%	903	11.88%
Total	8,405	8,732	3.88%	9,384	11.64%

The percentage increases were then assumed to represent the approximate increases in Downtown traffic, excluding external-external traffic which does not stop in the Downtown area and would therefore not be affected by increased Downtown economic activity. External-external traffic constitutes about 14% of all traffic: therefore, the percentage increases apply to only 86% of the existing traffic, and the increases in total traffic are somewhat less than suggested by the table. Figure 7 shows the percentage increases in traffic which have been calculated and used in later analyses. Note that the increase in traffic for Area 3 (the northern part of the study area) is lower than that suggested by the floor space projections. This was done because future development on both sides of Area 3 is substantially less than in Area 3 and much of the traffic in Area 3 is going to and from these adjacent areas.

TRAFFIC GROWTH DUE TO EXTERNAL TRAFFIC GROWTH

Between now and 1985 or 1995, Downtown traffic will also increase due to growth in external traffic. This external traffic growth includes external-external (E-E) trips which pass through Downtown without stopping, as well as external-internal (E-I) trips which are trips between Downtown and points outside Downtown. As areas around Downtown grow, we can expect more of these trips independently of what happens within the Downtown area. These two types of trips, which together constitute 80% of Downtown traffic (14% and 66% for E-E and E-I trips respectively) are assumed to



jhk & associates

Figure 7
Increase in Traffic Due to Future Build-Out

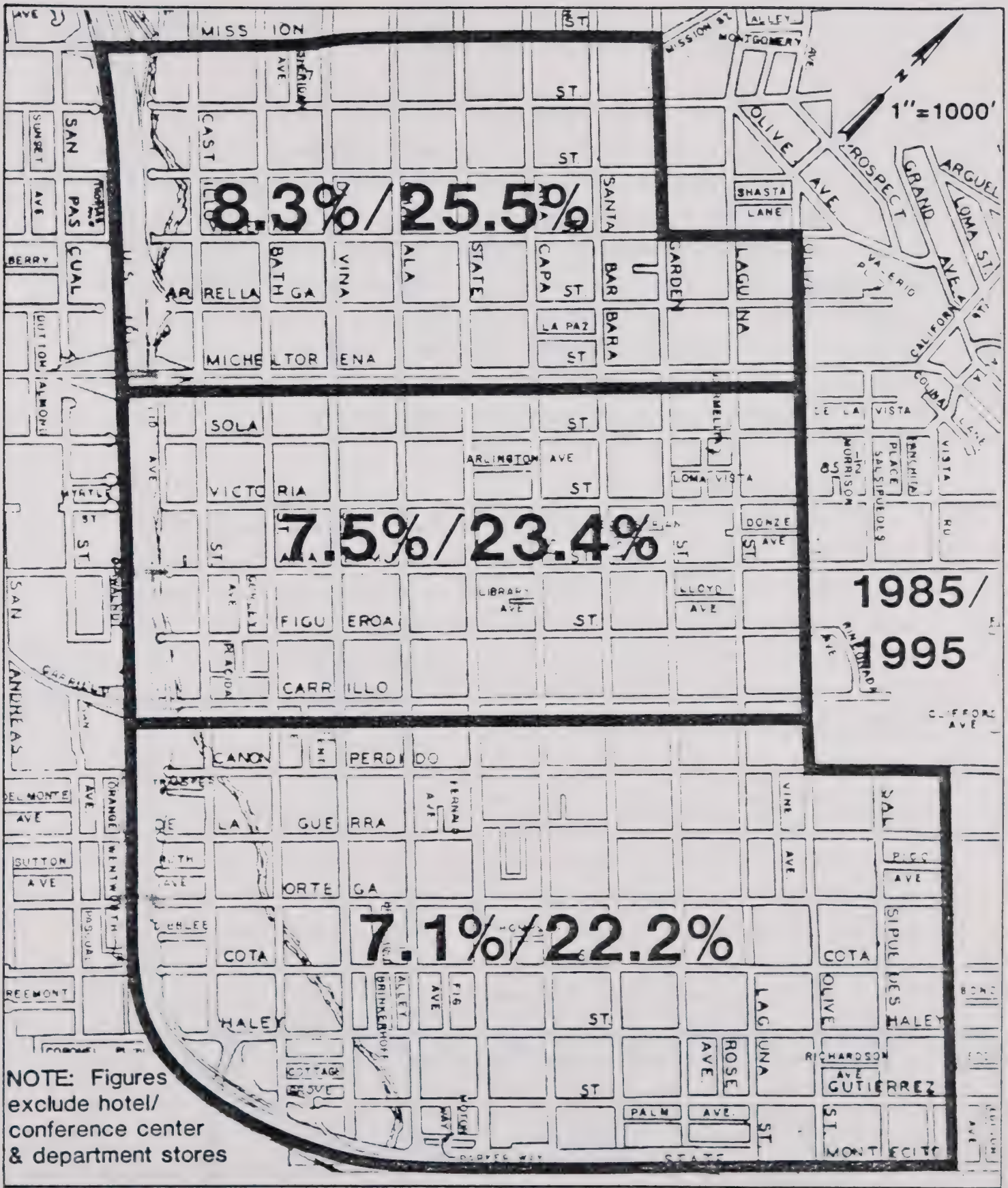
grow by 1% per year compounded. This results in an increase in total traffic of 4.0% by 1985, and 12.9% by 1995. When these projected increases are added to the increases due to future build-out calculated in the preceding section, the increases shown in Figure 8 are obtained.

TRAFFIC GROWTH DUE TO THE HOTEL/CONFERENCE CENTER AND DEPARTMENT STORES

While the traffic growth from future Downtown build-out and external growth will be fairly uniform over the Downtown area, the four major projects proposed for Downtown Santa Barbara--the hotel/conference center and the three department stores--will have much more focused impacts. To determine future traffic due to these projects, the amount of traffic generated by each project was calculated and manually assigned to the street system. These trips would then be added onto the future traffic levels predicted due to build-out and external growth.

Hotel/Conference Center

For the 475-room hotel/conference center, the City has estimated a daily trip generation rate of 10.5 trips/room (4988 daily trips) and a peak hour trip generation rate of 0.73 trips/room (347 daily trips). These trips were then divided into internal and external trips (trips within and to outside Downtown), based on the ratio of internal-internal and external-internal trips for all Downtown travel. This results in an estimated 266 external peak hour trips and 81 internal trips. Trips are assumed to divide equally between trips to and from the hotel, and increasing the proportion of external trips slightly to reflect the unique character of hotel travel, we have estimated about 140 external peak hour trips both to and from the hotel, and 40 internal trips both to and from the hotel, for a total peak hour trip generation of 360 trips.



jhk & associates

Figure 8
Increases in Traffic Due to Future Build-Out and External Traffic Growth

The external and internal trips were then manually assigned to the street system as shown in Figures 9 and 10. For external trips, trips were distributed according to the breakdown of traffic entering Downtown as reported in the 1975 Transportation Management Plan. For internal trips, about half the trips were assumed to go north of Carrillo Streets, and half were assumed to go south of Carrillo Street. Figures 9 and 10 show the percentage of all trips in each trip category (internal/external and to/from the hotel) traveling on each street.

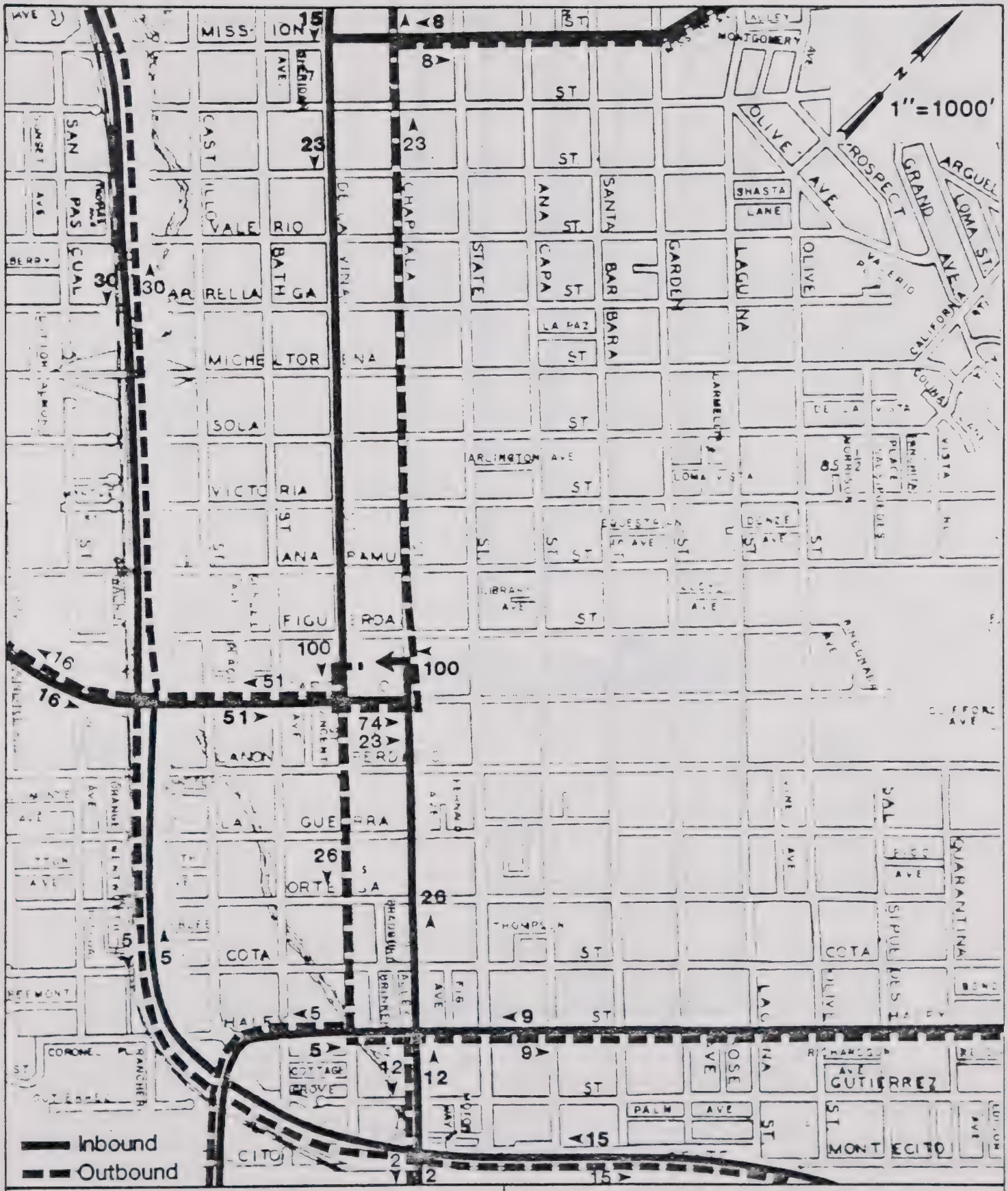
Department Stores

In developing traffic forecasts for the department stores, it was necessary to first develop an appropriate trip generation rate. Relying upon studies of other Downtown department stores is unreliable because local characteristics will greatly influence the trip generation rate. Instead, an effort was made to define the existing retail trip generation rate based on existing traffic volumes and floor space data.

First, a cordon line was established around the Downtown study area, and an estimate of the daily traffic entering and leaving Downtown was established. As shown in Table 4, the total number of daily cordon crossings was estimated to be 212,700. These 212,700 crossings are made up of the sum of all external-internal (E-I) trips in the Downtown study area plus twice the external-external (E-E) trips (since these trips cross the screen-line twice). Based on the assumed ratio of E-I, E-E, and I-I trips (66-14-20, respectively), we can estimate the number of each type of trip since we have three equations and three unknowns:

1) $2\,(E\text{-}E) + (I\text{-}E) = 212{,}700$
2) $(E\text{-}E)/(I\text{-}E) = 14/66$
3) $(E\text{-}E)/(I\text{-}I) = 14/20$

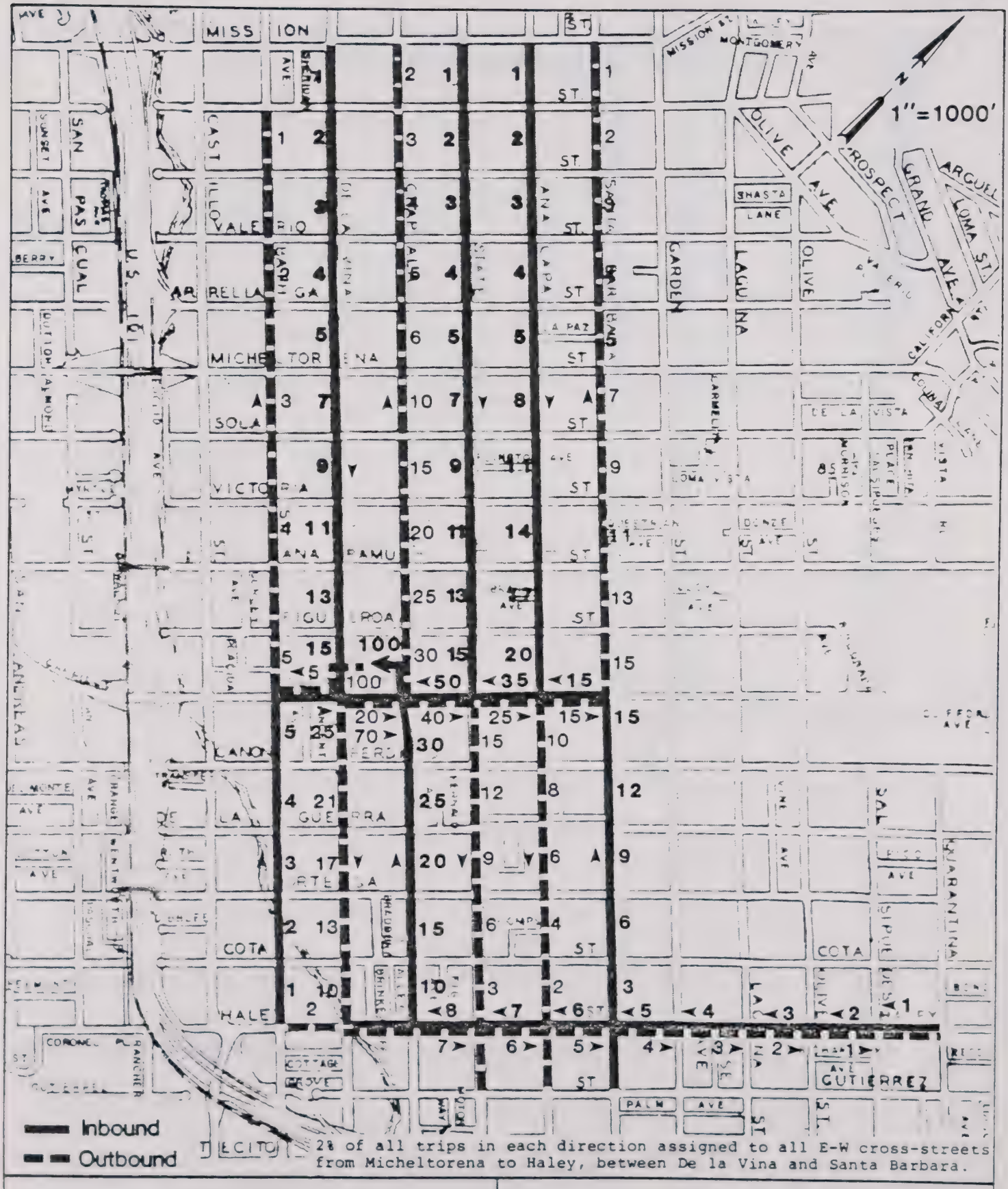
(E-E), (I-E), and (I-I) represent the numbers of each trip type.



Base =140 Peak Hour Trips

jhk & associates

Figure 9
Hotel/Conference Center
External Trip Assignment Percentage



Base = 40 Peak Hour Trips

jhk & associates

Figure 10
Hotel/Conference Center
Internal Trip Assignment Percentage

Table 4

Santa Barbara
Downtown Study Area
Cordon Counts

Street (Boundary)	Ingoing ADT	Outgoing ADT
Mission (W)	5,700	7,000
Arrellaga (W)	600	1,200
Micheltorena (W)	3,600	3,500
Carrillo (W)	13,100	12,900
Haley (W)	--	11,700
Castillo (S)	15,300	8,200
Bath (S)	1,600	--
Chapala (S)	3,200	1,400
State (S)	3,900	3,200
Anacapa (S)	--	2,600
Santa Barbara (S)	4,800	--
Laguna (S) [Freeway Ramps]	1,500	1,500
Salsipuedes (S)	500	500
Quarantina (S)	500	500
Montecito (E)	1,900	1,200
Gutierrez (E)	1,800	2,200
Reddick (E)	250	250
Haley (E)	3,000	4,100
Bond (E)	250	250
Cota (E)	2,600	3,400
De La Guerra (E)	1,800	1,000
Canon Perdido (E)	2,400	2,800
Carrillo (E)	400	400
Figueroa (E)	300	400
Anapamu (E)	3,900	3,200
Victoria (E)	900	1,200

Table 4 (cont.)

Santa Barbara
Downtown Study Area
Cordon Counts

Street (Boundary)	Ingoing ADT	Outgoing ADT
Sola (E)	500	700
De La Vista (E)	250	250
Micheltorena (E)	2,000	1,600
Arrellaga (E)	500	500
Valerio (E)	1,400	1,300
Olive (N)	1,500	1,500
Laguna (N)	1,000	500
Garden (N)	3,000	2,600
Santa Barbara (N)	--	4,000
Islay (E)	500	500
Pedregosa (E)	500	500
Mission (E)	2,300	2,300
Anacapa (N)	2,200	2,000
State (N)	5,800	5,400
Chapala (N)	--	5,200
De la Vina (N)	9,400	--
Bath (N)	1,300	2,200
Castillo (N)	1,600	1,000
TOTAL	106,550	106,150

212,700 daily cordon crossings

This results in the following estimates of trip totals for the Downtown study area:

External-external trips:	31,700	(14%)
Internal-internal trips:	45,300	(20%)
External-internal trips:	149,300	(66%)
	226,300	(100%)

Based on these results, the number of trip ends within the Downtown study area is 239,900 [149,300 + 2(45,300)]. This figure includes trips to and from residential units in the study area. These trip ends are estimated to be 25,000 (an estimated 10,000 residents times 2.5 trips/resident). Thus, the daily internal trip ends due to commercial development in the study area is estimated to be 214,900.

This figure is then compared to the total amount of "retail-equivalent" floor space in the Downtown study area, which was calculated by converting non-retail floor space into a lesser amount of retail floor space, reflecting the lower trip generation rates of non-retail compared to retail floor space use. (See earlier section.) Half of the floor space in Area 4 north of the study area was included in the calculation of Downtown floor space since much of the traffic to and from this area uses Mission Street, which is within the study area. The calculated amount of retail equivalent floor space is thus 8,001,802 square feet, and the 214,900 trip ends represents a trip generation rate of 26.9 trips/1000 square feet (214,900/8,002). This result is lower than what is generally found for a freestanding suburban department stores, but is in the range of results for very large shopping malls (over 1 million square feet). No studies were found for stores within a Downtown area the size of Santa Barbara.

Using the rate of 26.9 trips/1000 square feet, each departmentstore would generate 4035 daily trips (150 X 26.9). Being conservative and taking 10% of this figure to represent the peak hour, there are about 400 daily trips. As with the hotel/

conference center, these trips were divided into internal and external trips, with the proportion of internal trips increased slightly to reflect the greater tendency of shoppers to travel to another Downtown store. The result is that there are an estimated 300 external peak hour trips (150 each direction) and 100 internal peak hour trips (50 each direction).

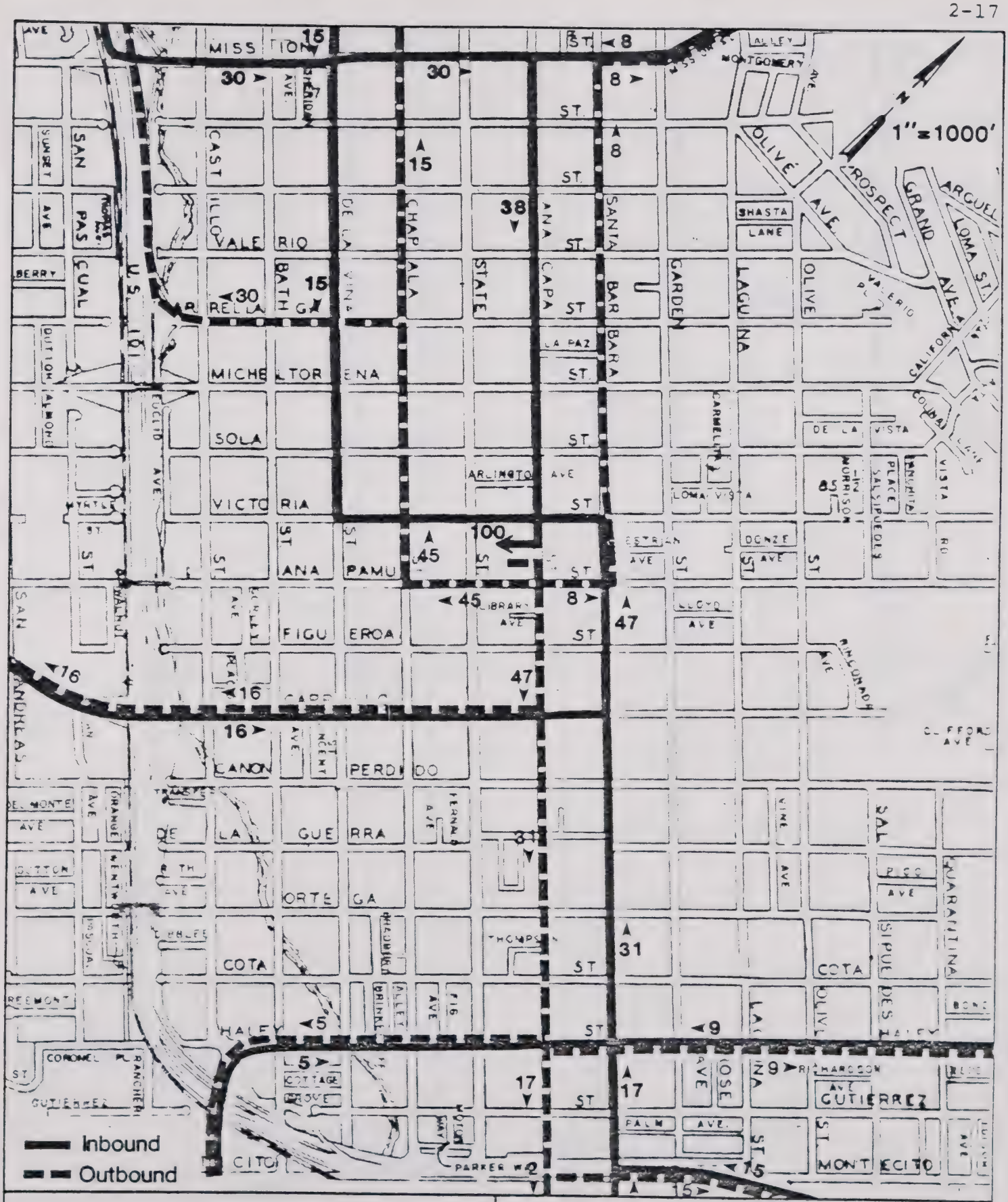
As with the hotel conference center, these trips were manually assigned to the existing street system, as shown in Figures 11 to 16. Trips to and from each department store were assigned separately since their locations influence the assignment process.

LEVEL OF SERVICE FOR SCENARIOS 1 AND 3

Methodology

Scenarios 1 and 3, for 1985 and 1995 respectively, include the three department stores and the hotel/conference center, but exclude the Presidio restoration and completion of the Crosstown Freeway. These are thus the scenarios that examine the effectiveness of the existing street system in 1985 and 1995 respectively.

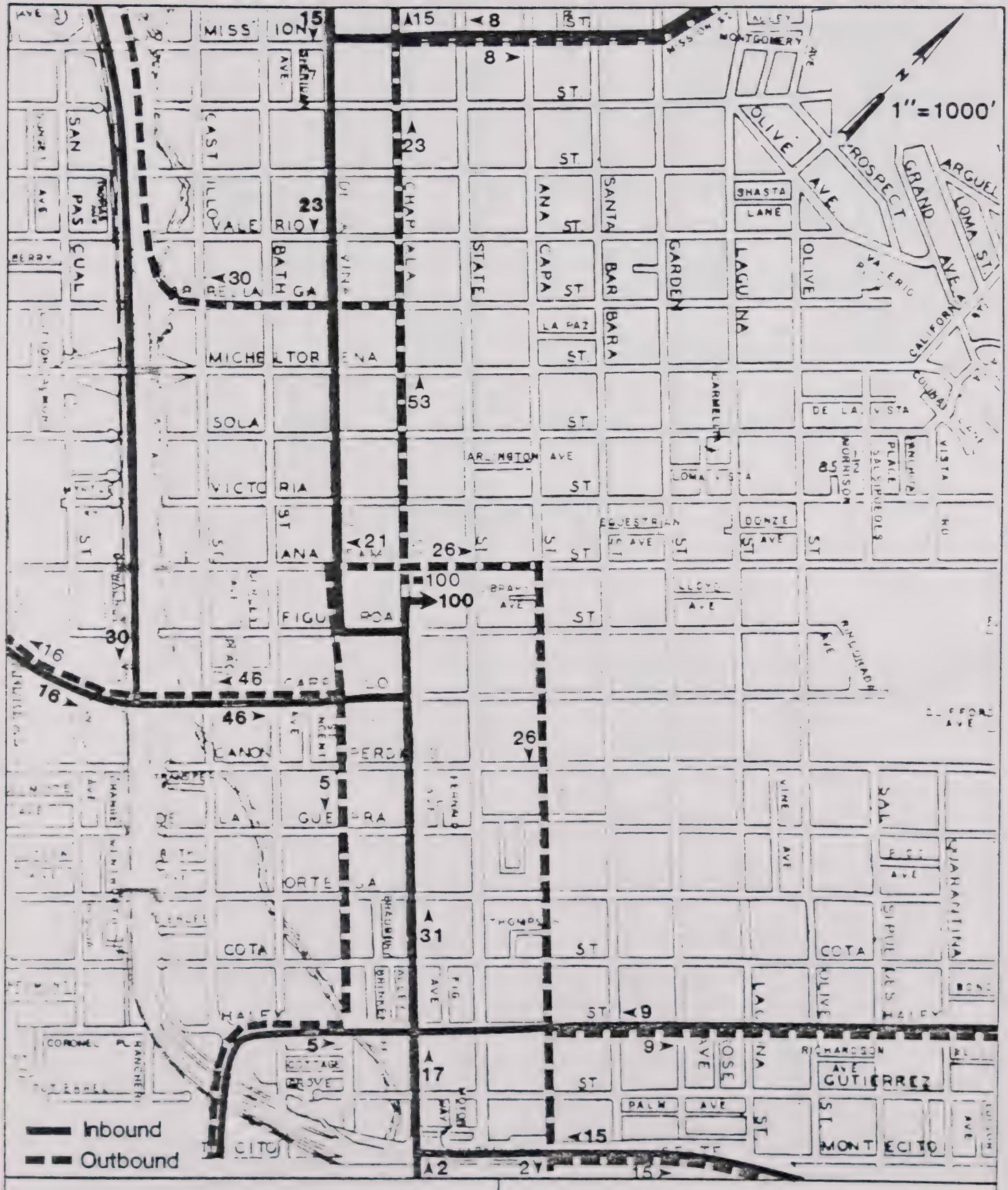
To estimate hourly traffic volumes for these scenarios, the results of the traffic forecasting process described in the previous chapter were used. The derivation of future traffic required three steps. First, traffic volumes at each approach were increased by a factor to account for growth in external traffic and growth due to future Downtown development (excluding the department stores and hotel/conference center). These increases ranged from 7.1% to 8.3% for the 1985 scenarios and from 22.2 to 25.5% for the 1995 scenario (See Figure 5). Second, the internal trips generated by the department stores and hotel/conference center were summed for each approach and added to the



Base = 150 Peak Hour Trips

jhk & associates

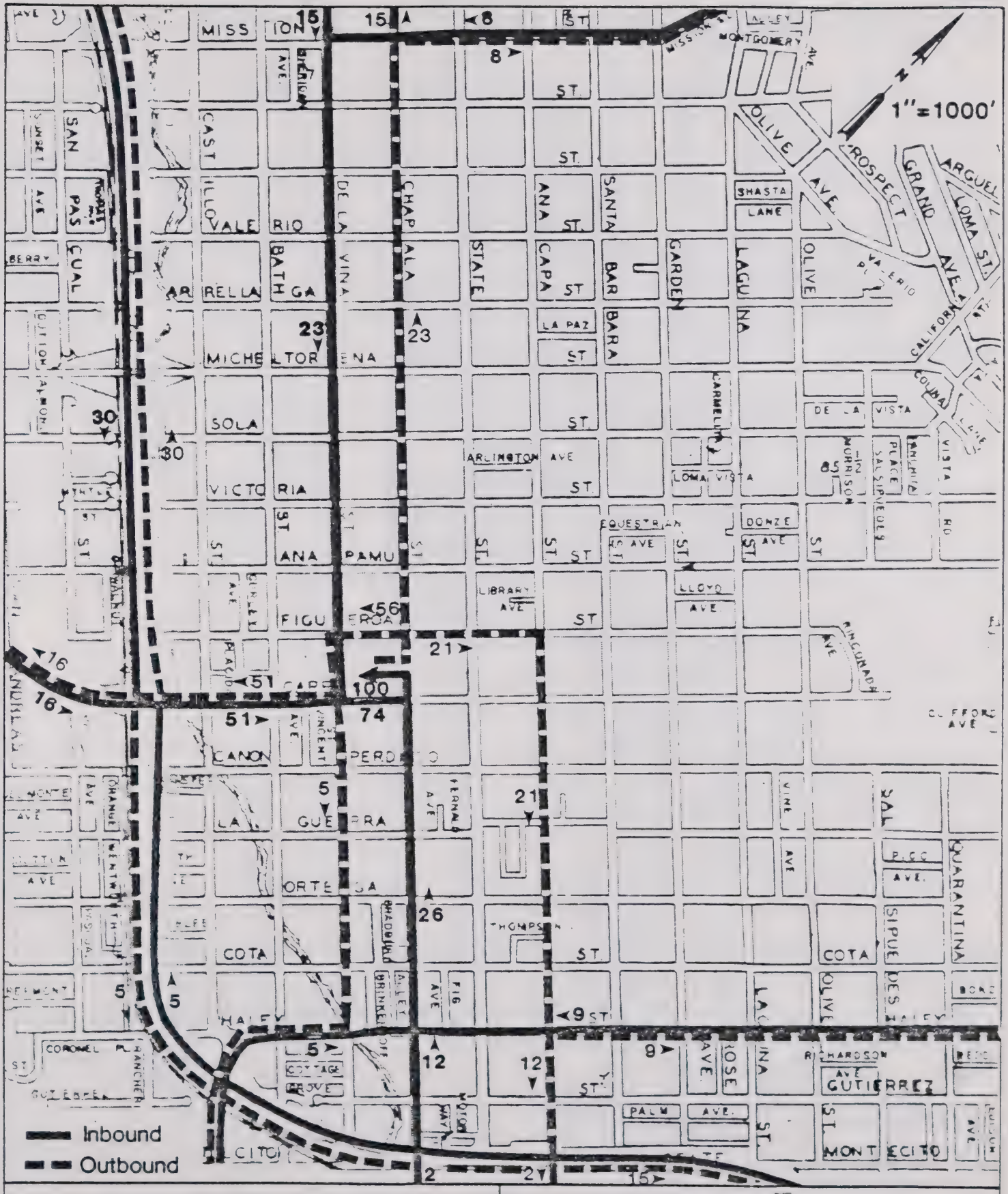
Figure 11
Northern Department Store
External Trip Assignment Percentage



Base=150 Peak Hour Trips

jhk & associates

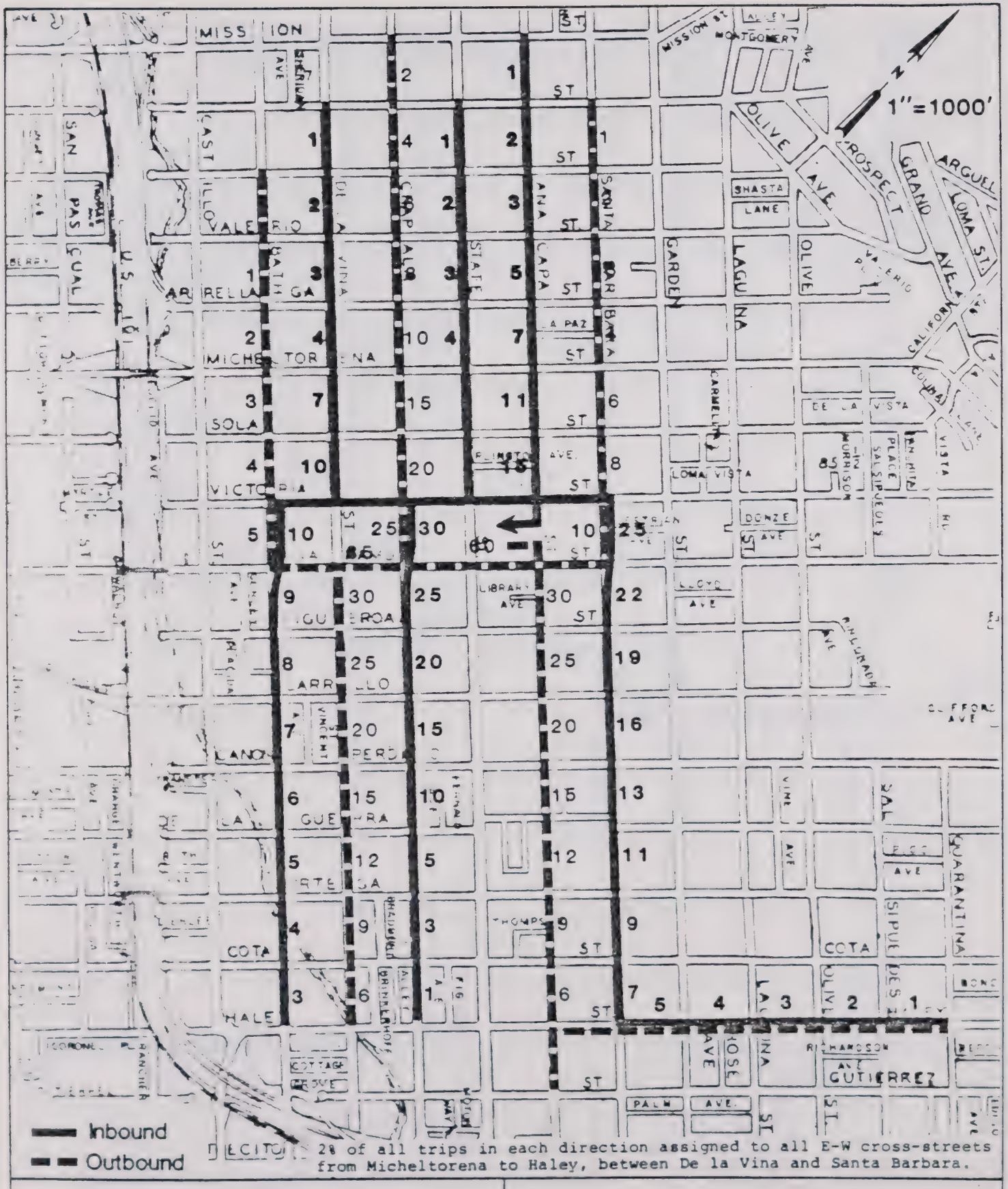
Figure 12
Central Department Store
External Trip Assignment Percentage



Base=150 Peak Hour Trips

jhk & associates

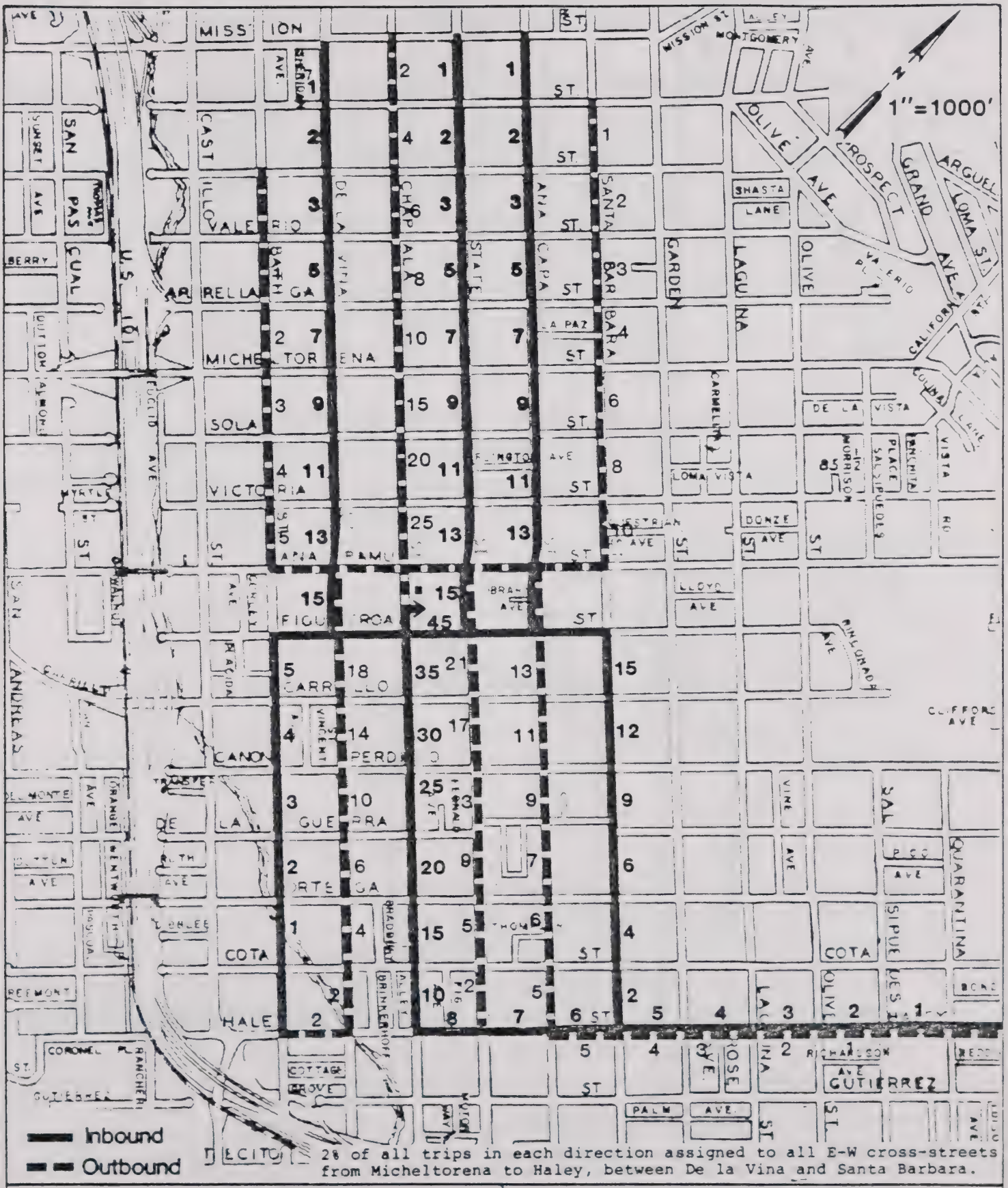
Figure 13
Southern Department Store
External Trip Assignment Percentage



Base = 50 Peak Hour Trips

jhk & associates

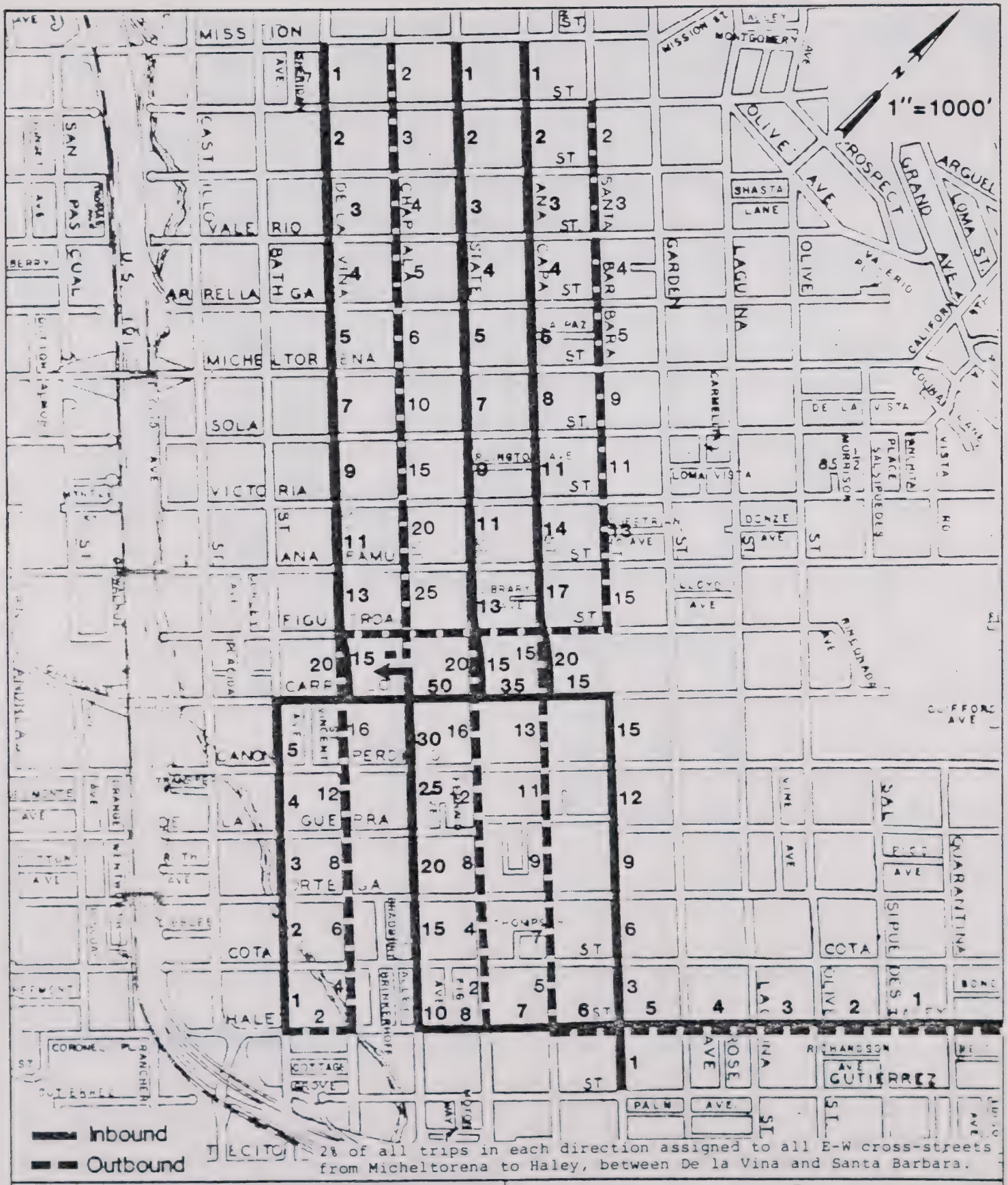
Figure 14
Northern Department Store
Internal Trip Assignment Percentage



Base = 50 Peak Hour Trips

jhk & associates

Figure 15
Central Department Store
Internal Trip Assignment Percentage



Base = 50 Peak Hour Trips

jhk & associates

Figure 16
Southern Department Store
Internal Trip Assignment Percentage

approach volume, using the same turning movement percentages as currently exist. Finally, the external trips from the department stores and hotel/conference center were added to the approach volumes. In this case, the actual turning movements based on the assignment process were used since the paths of external trips through the Downtown network can be estimated more reliably than for internal trips, which would diffuse over many streets a short distance away from the trip generator.

Results

The results of this process were then used to calculate the level of service. Table 5 shows the calculated critical volume/capacity ratio for each intersection and Figures 17 and 18 show the resulting levels of service. As the two figures clearly indicate, the greatest problems occur at intersections involving the three major east-west streets: Haley, Carrillo and Mission Streets. Of the 15 intersections projected to operate at a level of service C or worse in 1985, 12 are on these three streets. In the 1995 scenario, 17 of the 23 intersections with level of service C or worse are on these streets. Four of the other six intersections are on State Street.

LEVEL OF SERVICE FOR SCENARIO 4

Methodology

Scenario 4 is a 1995 scenario that includes normal build-out, the three proposed department stores, the hotel/conference center, the restoration of the Presidio, and the closing of Santa Barbara Street at Canon Perdido Street. This scenario is thus the same as Scenario 3, except for the Presidio restoration and the closing of Santa Barbara Street.

The Presidio restoration itself has very little impact on traffic into and out of the Downtown area because the demolition

Table 5

FUTURE VOLUME/CAPACITY RATIOS
AVERAGE WEEKDAY PM PEAK HOUR

INTERSECTION	VOLUME/CAPACITY RATIO* Scenario (Year) 1(1985)	3(1995)	4(1995)	6(1995)
Anacapa/Anapamu	.59	.67	.67	.67
Anacapa/Canon Perdido	.57	.64	.55	.49
Anacapa/Carrillo	.69	.81	.85	.83
Anacapa/Cota	.53	.60	.60	.48
Anacapa/De La Gerra	.58	.65	.70	.61
Anacapa/Figueroa	.37	.42	.42	.42
Anacapa/Haley	.73	.82	.82	.68
Anacapa/Micheltorena	.38	.43	.43	.43
Anacapa/Ortega	.43	.49	.49	.38
Anacapa/Victoria	.49	.55	.55	.55
Anapamu/Chapala	.45	.51	.53	.53
Anapamu/De La Vina	.45	.50	.50	.50
Anapamu/Garden	.45	.52	.69	.69
Anapamu/Santa Barbara	.59	.67	.49	.49
Anapamu/State	.77	.87	.95	.95
Bath/Carrillo	.80	.91	.91	.91
Bath/Haley	.65	.96	.96	1.03
Bath/Micheltorena	.46	.51	.51	.51
Bath/Mission	.57	.66	.66	.66
Canon Perdido/Chapala	.45	.50	.55	.56
Canon Perdido/Santa Barbara	.51	.59	—	—

*Level of Service — V/C Ratio

A	Less than .60
B	.60 - .70
C	.70 - .80
D	.80 - .90
E	Greater than .90

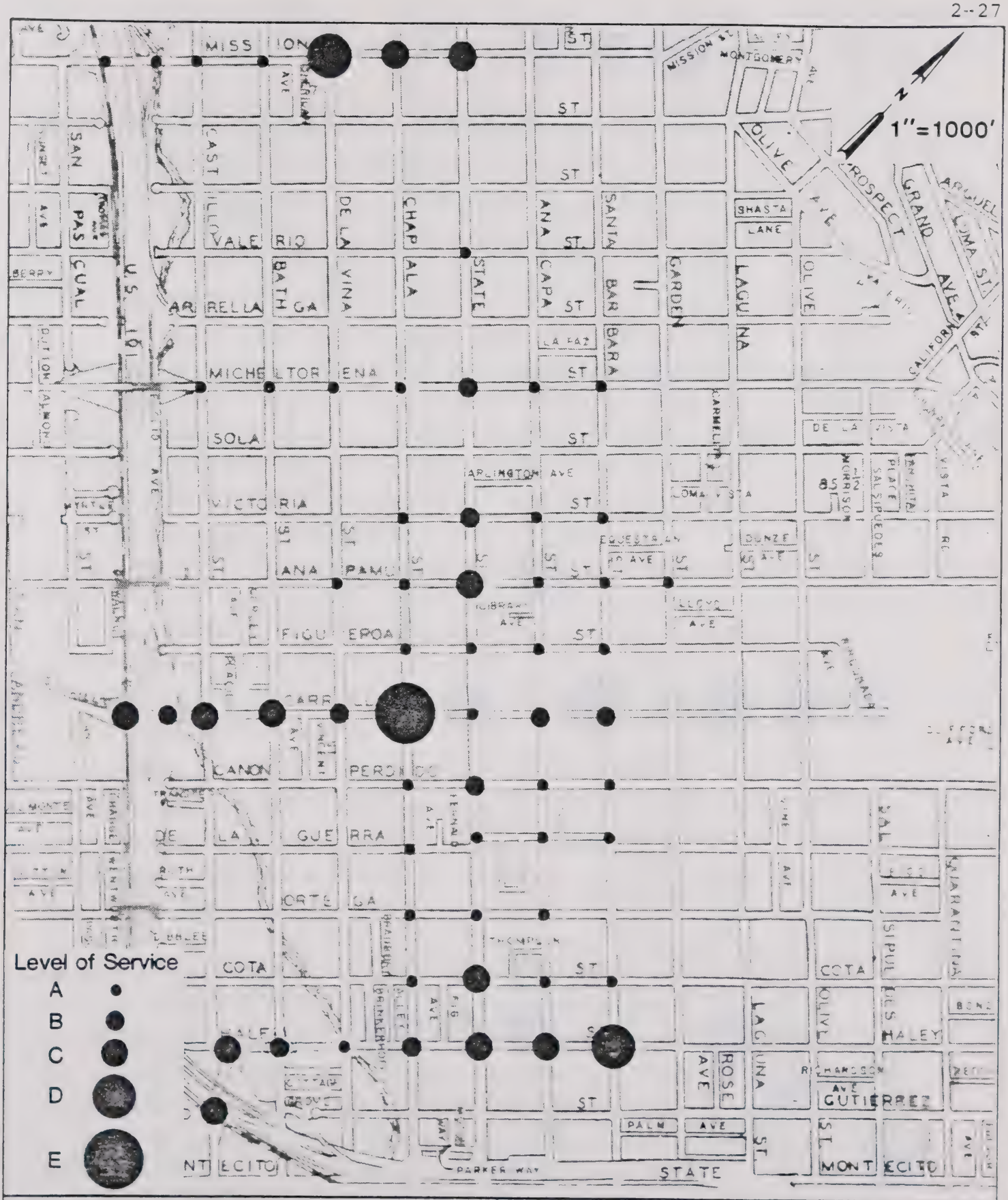
Table 5 (cont.)
FUTURE VOLUME/CAPACITY RATIOS
AVERAGE WEEKDAY PM PEAK HOUR

Canon Perdido/State	.60	.68	.72	.71
Carrillo/101 NB	.67	.76	.76	.76
Carrillo/101 SB	.76	.86	.86	.86
Carrillo/Castillo	.72	.82	.82	.82
Carrillo/Chapala	1.00	1.10	1.15	1.16
Carrillo/De La Vina	.64	.71	.71	.72
Carrillo/Santa Barbara	.67	.76	.49	.49
Carrillo/State	.46	.52	.61	.60
Castillo/101 SB	.77	.88	.88	.76
Castillo/Haley	.72	.82	.82	.91
Castillo/Micheltorena	.53	.62	.62	.62
Castillo/Mission	.51	.59	.59	.59
Chapala/Cota	.69	.80	.84	.86
Chapala/De La Guerra	.36	.40	.44	.45
Chapala/Figueroa	.38	.42	.45	.45
Chapala/Haley	.65	.74	.76	.77
Chapala/Micheltorena	.59	.67	.69	.69
Chapala/Mission	.76	.87	.88	.88
Chapala/Ortega	.53	.59	.64	.67
Chapala/Victoria	.53	.59	.63	.63
Cota/Santa Barbara	.56	.63	.43	.41
Cota/State	.75	.85	.93	.91
De La Guerra/Santa Barbara	.47	.54	.43	.42
De La Guerra/State	.38	.43	.52	.50
De La Vina/Haley	.46	.54	.54	.54
De La Vina/Micheltorena	.58	.66	.66	.66
De La Vina/Mission	.80	.92	.92	.92
Figueroa/Santa Barbara	.41	.46	.20	.20
Figueroa/State	.48	.54	.61	.60
Haley/Santa Barbara	.80	.91	.77	.74

Table 5 (cont.)

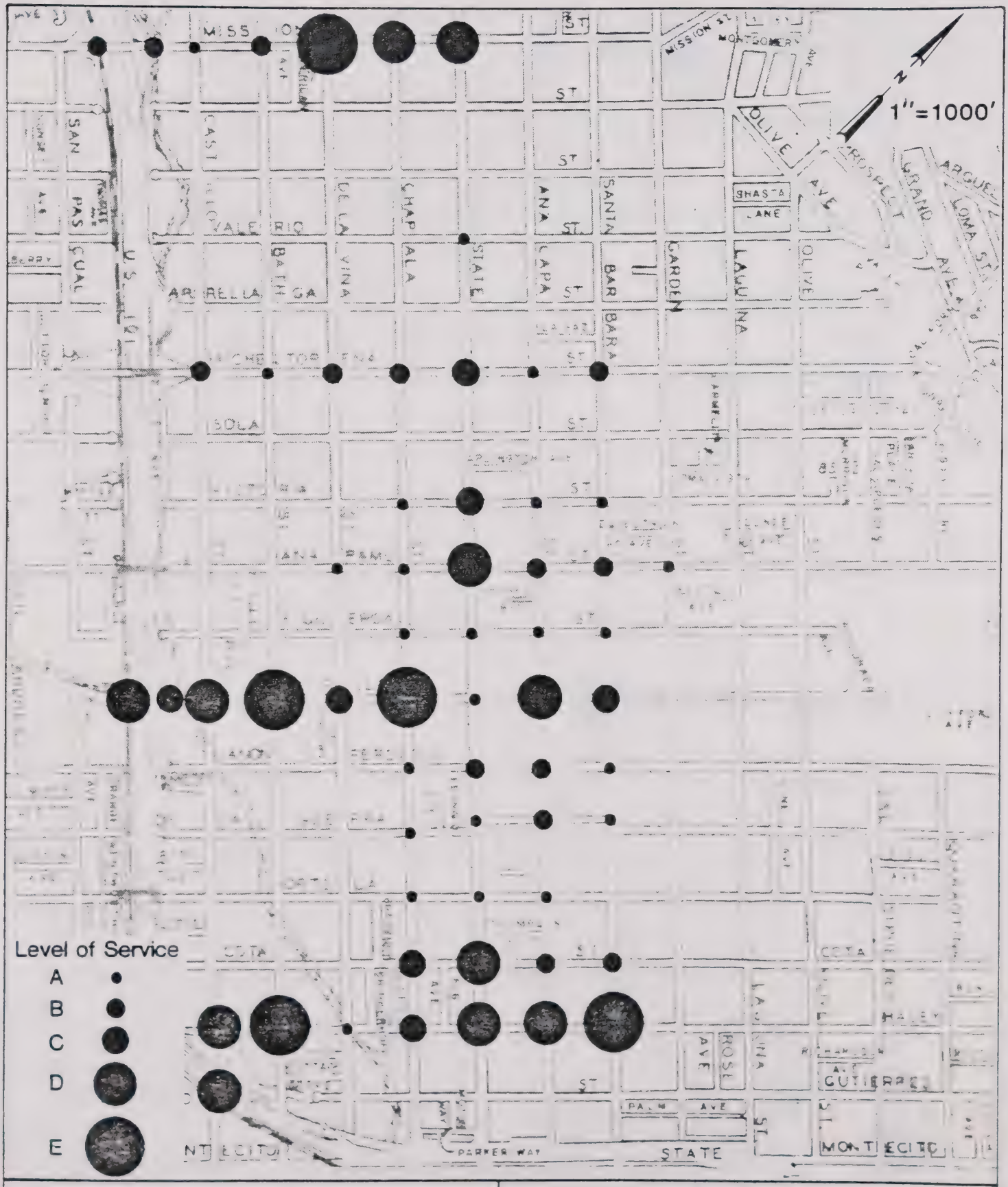
FUTURE VOLUME/CAPACITY RATIOS
AVERAGE WEEKDAY PM PEAK HOUR

Haley/State	.75	.82	.82	.88
Micheltorena/Santa Barbara	.55	.63	.52	.52
Micheltorena/State	.66	.76	.80	.80
Mission/101 NB	.57	.65	.65	.65
Mission/101 SB	.59	.68	.68	.68
Mission/State	.79	.90	.92	.92
Ortega/State	.49	.56	.65	.61
Santa Barbara/Victoria	.44	.49	.31	.31
State/Valerio	.48	.55	.58	.59
State/Victoria	.67	.76	.82	.82



jhk & associates

Figure 17
Scenario 1 (1985)
Average Weekday PM
Peak Hour Level of Service



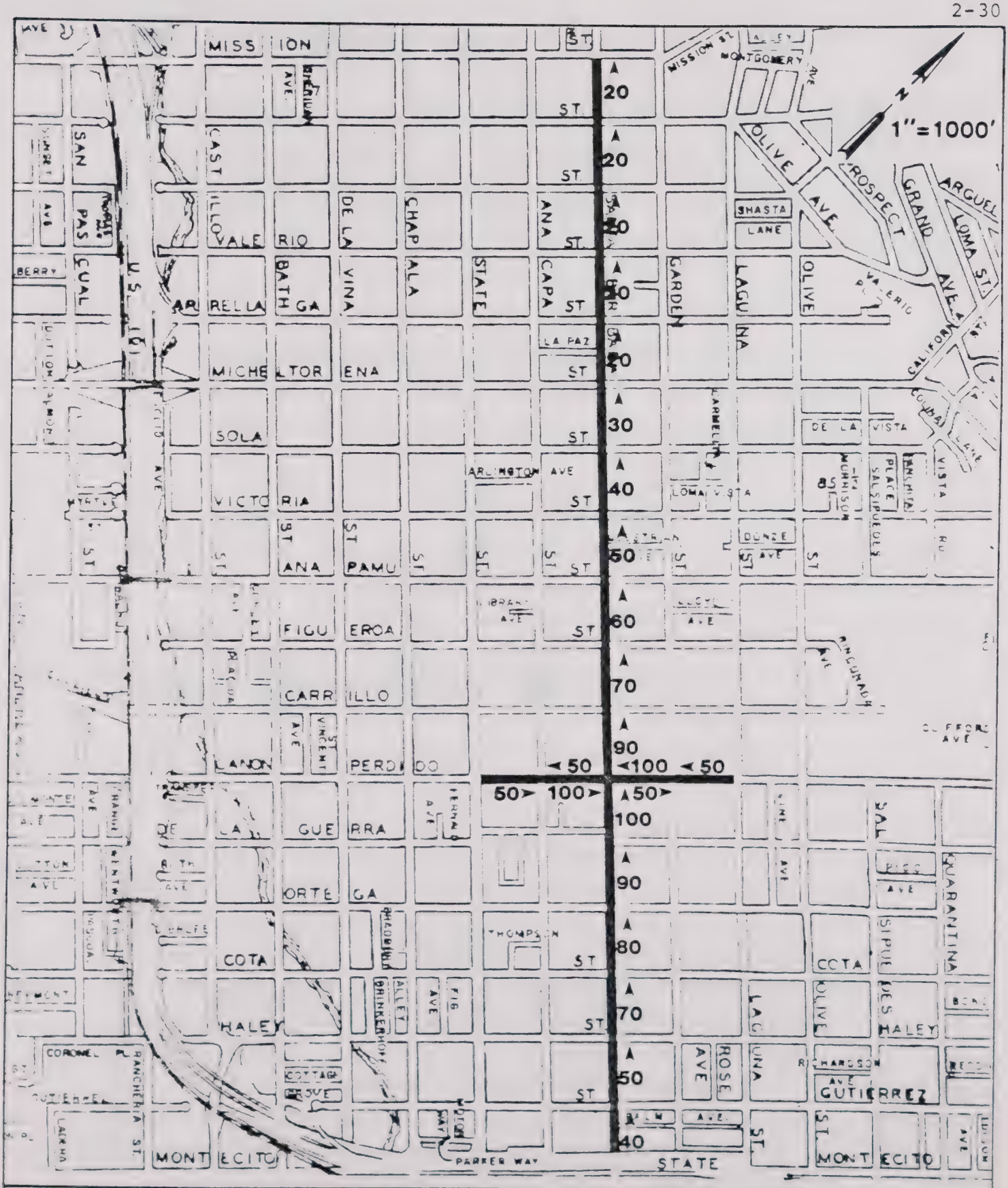
jhk & associates

Figure 18
Scenario 3
(1995 without Presidio or Freeway)
Average Weekday PM
Peak Hour Level of Service

of buildings to make room for the Presidio will cause a decrease in traffic that largely compensates for the traffic increase caused by the Presidio. Rather, the major traffic impact of the Presidio project is the reassignment of traffic caused by the closing of the intersection of Santa Barbara and Canon Perdido Streets.

In order to calculate this impact, 1995 traffic on Santa Barbara and Canon Perdido Streets, as calculated in Scenario 3, was reassigned manually to adjacent streets. Figure 19 shows the percentage of traffic on each section of each street that was reassigned. The percentages of traffic diverted from Santa Barbara Street are based on the results of a 1977 origin-destination study conducted at the intersection. Diversions from Canon Perdido Street were only done for three blocks in each direction since it serves far less through traffic. Of the diverted Santa Barbara Street traffic, 60% was diverted to Garden Street, and 20% was diverted to both State and Chapala Streets. Canon Perdido traffic was diverted equally to Carrillo and De La Guerra Streets.

On Santa Barbara Street, the diverted traffic south of Canon Perdido traffic was taken solely from the through traffic (as opposed to turning traffic) and reassigned on Garden, State and Chapala Streets as through traffic. This reflects the fact that the diverted traffic is proceeding past Canon Perdido Street. North of Canon Perdido (and including the Canon Perdido intersection), the diverted traffic was taken proportionally from each turning movement since this traffic would gradually turn off Santa Barbara Street. However, the reassigned traffic reflected the turning movement percentages on the receiving street rather than Santa Barbara Street. This was done because most turning traffic on Santa Barbara Street turns left toward the center of Downtown, but if the traffic were diverted to State and Chapala Streets, it would be more likely to turn right to get to the same places.



jhk & associates

Figure 19
Percentage of Traffic Diverted due to Presidio Restoration

On Canon Perdido, the diverted traffic was taken proportionally from each turning movement and reassigned in the same proportions to the receiving street.

Results

After reassigning traffic, as described above, level of service was recalculated for those signalized intersections affected by the reassignment process (All intersections on Garden, Santa Barbara, State and Chapala Streets, and three intersections on Anacapa Street). The results are shown in Table 6, relative to the results of Scenario 3. Figure 20 shows the level of service results for all intersections.

Santa Barbara Street

Congestion on Santa Barbara Street decreases markedly because of the Presidio restoration. Of the eight signalized intersections on Santa Barbara Street, seven will operate at level of service A, while the Haley intersection will improve from a level of service E to a level of service C.

Chapala Street

Traffic on Chapala Street will increase such that there is up to a 5% increase in the saturation levels at its intersections (approximately half a service level). Although there are no new intersections which degrade to a level of service C, the Chapala/Cota intersection goes from a C to D and two intersections go from A to B.

State Street

The increase in traffic on State Street was assumed to be about the same as for Chapala, but since State Street has lower volumes and capacity, the relative impact is greater. The degree of saturation rises by as much as 9% (about one service level

Table 6

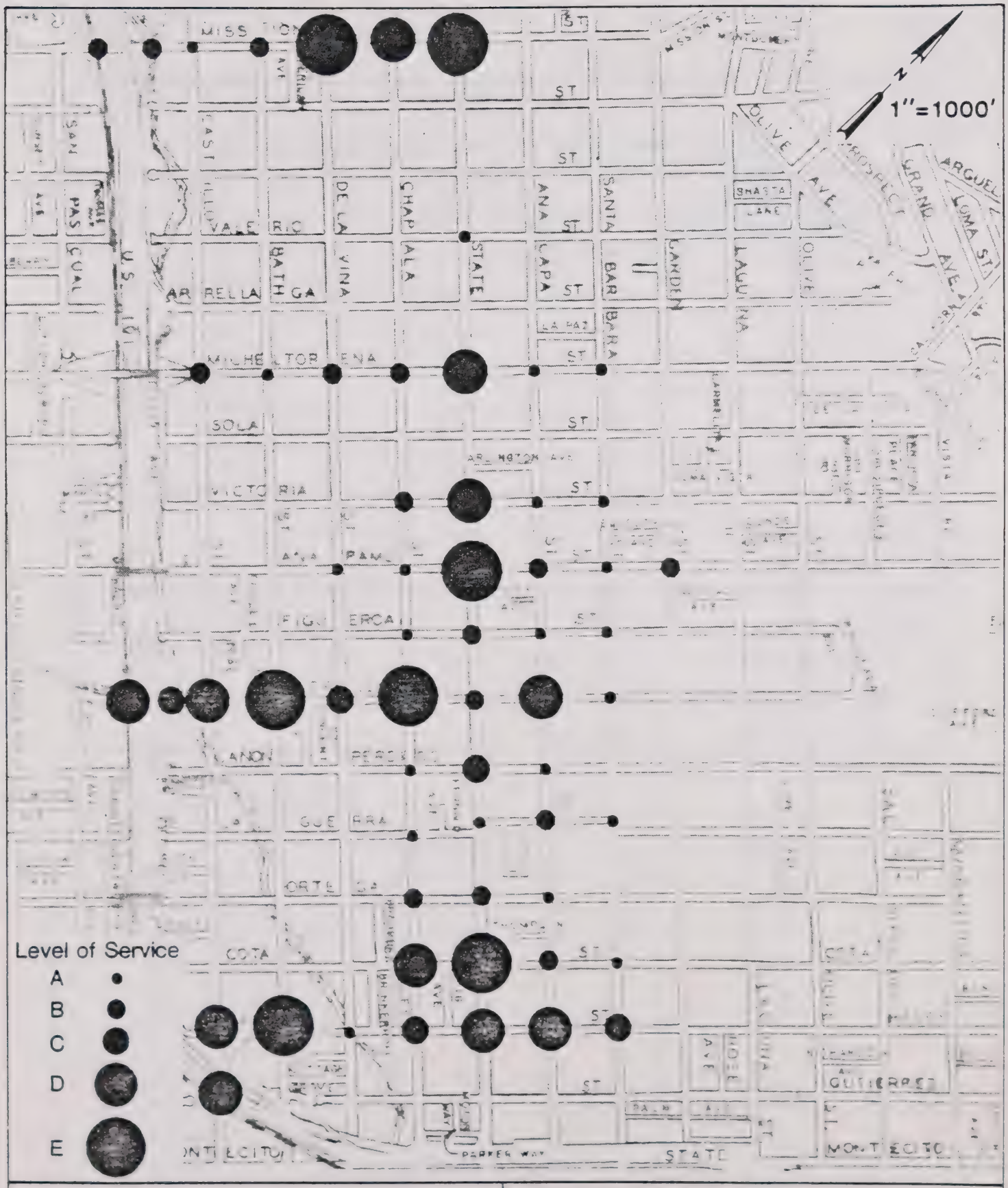
TRAFFIC IMPACTS OF THE PRESIDIO RESTORATION

Intersection	Scenario 3 (1995 without Presidio)		Scenario 4 (1995 with Presidio)	
	V/C(%)	LOS	V/C(%)	LOS
Santa Barbara Street				
Haley	91	E	77	C
Cota	63	B	43	A
De La Guerra	54	A	43	A
Canon Perdido	59	A	closed	
Carrillo	76	C	49	A
Figueroa	46	A	20	A
Anapamu	67	B	49	A
Victoria	49	A	31	A
Micheltorena	63	B	52	A
Chapala Street				
Haley	74	C	76	C
Cota	80	C	84	D
Ortega	59	A	64	B
De La Guerra	40	A	44	A
Canon Perdido	50	A	55	A
Carrillo	110	E	115	E
Figueroa	42	A	45	A
Anapamu	51	A	53	A
Victoria	59	A	63	B
Micheltorena	67	B	69	B
Mission	87	D	88	D
State Street				
Haley	82	D	82	D
Cota	85	D	93	E
Ortega	56	A	65	B

Table 6 (cont.)

TRAFFIC IMPACTS OF THE PRESIDIO RESTORATION

De La Guerra	43	A	52	A
Canon Perdido	68	B	72	C
Carrillo	52	A	61	B
Figueroa	54	A	61	B
Anapamu	87	D	95	E
Victoria	76	C	82	D
Micheltorena	76	C	80	D
Valerio	55	A	58	A
Mission	90	D	92	E
Garden Street				
Anapamu	52	A	69	B
Anacapa Street				
De La Guerra	65	B	70	B
Canon Perdido	64	B	55	A
Carrillo	81	D	85	D



jhk & associates

Figure 20
Scenario 4
(1995 with Presidio & without Freeway)
Average Weekday PM
Peak Hour Level of Service

designation). The Canon Perdido intersection goes from B to C, while the Victoria and Micheltorena intersections go from C to D. Level of service at the Cota, Anapamu and Mission intersections rise from D to E. Half of the twelve State Street intersections would operate at a level of service D or E.

Garden Street

Garden Street has the greatest increase in traffic, and the level of service at the Anapamu intersection (the only signalized intersection) rises from A to B. However, the increased traffic will generate the need for several additional signals on Garden, as discussed in the next chapter.

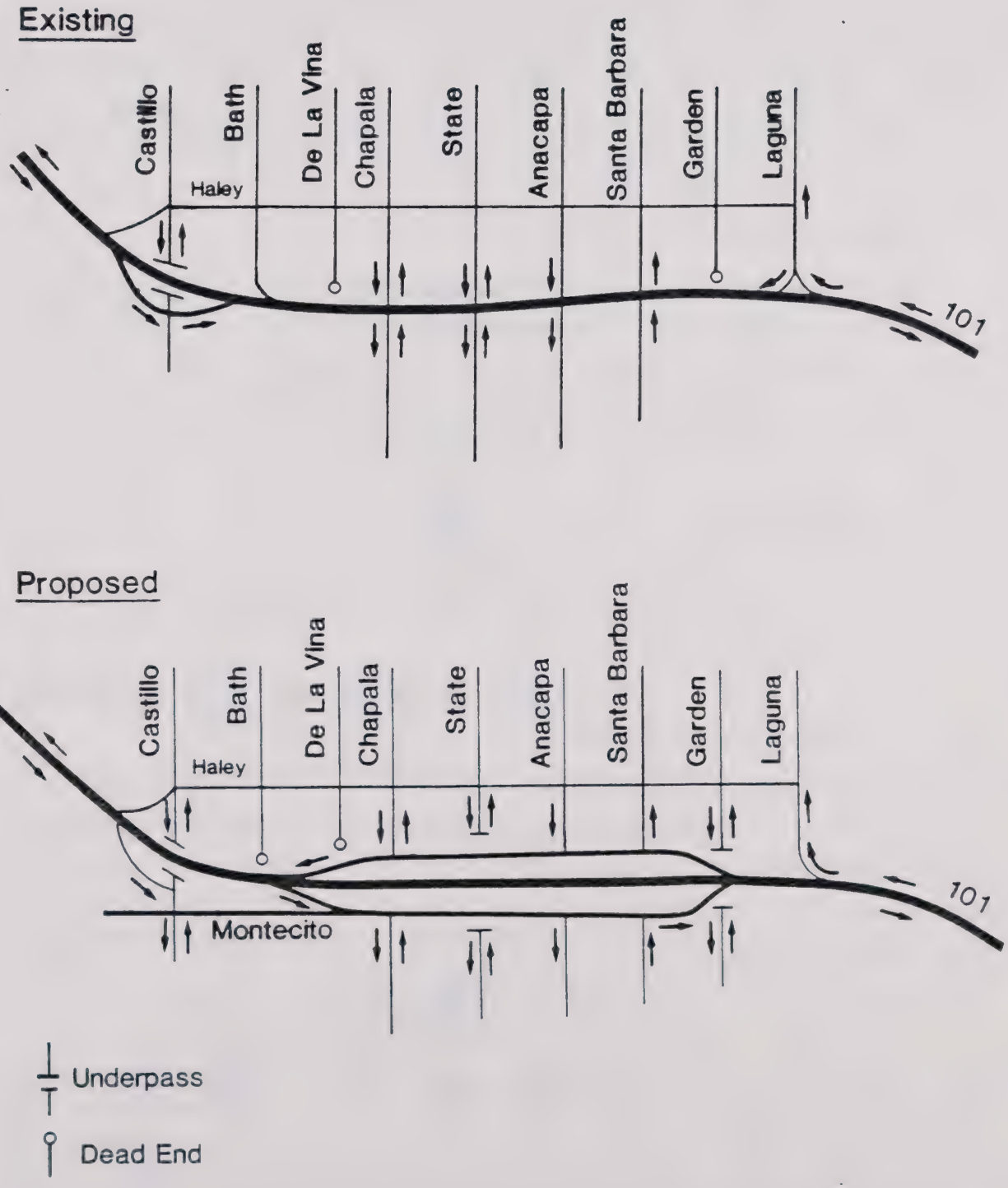
Anacapa Street

Increased cross-street traffic will occur at the De La Guerra and Carrillo intersections, but no changes in level of service are projected.

LEVEL OF SERVICE FOR SCENARIO 6

Scenario 6 is a 1995 scenario that includes normal build-out, the three proposed department stores, the hotel/conference center, the Presidio restoration with the closing of Santa Barbara Street at Canon Perdido, and the construction of the 101 Crosstown Freeway. This scenario is thus the same as scenario 4, except for the Crosstown Freeway project.

A schematic view of how the Crosstown Freeway will affect traffic circulation is shown in Figure 21. For traffic heading into Downtown, the impacts are relatively small. The most significant traffic movement is traffic that is heading westbound (north) on 101 and turns right onto Laguna, Santa Barbara State, Chapala or Bath Streets. With the freeway project,



jhk & associates

Figure 21
Circulation Impacts
of Crosstown Freeway

Bath and State Streets will not be directly accessible, so the other streets will get slightly more traffic. Traffic that currently crosses 101 to get Downtown now uses Castillo, Chapala, State and Santa Barbara Streets; in the future they will be restricted to Castillo, State and Garden Streets. Eastbound 101 traffic turning left onto Chapala, State or Santa Barbara Streets will be forced to make major detours, but these are relatively small traffic movements.

The greatest disruption will be to traffic leaving Downtown. Traffic that now turns left onto the freeway, primarily on Anacapa, will be unable to do so and will have to go under the freeway at State or Garden, go one block south to Yanonali, and then return to the freeway to get on it. Alternatively, they can detour to Castillo or the Milpas Street on-ramp.

Using 1977 turning movement counts supplied by Caltrans, the amount of traffic on each street heading in each direction (across 101, and eastbound and westbound on 101) was estimated. Traffic was then reassigned according to the following rules:

Inbound Traffic

1) Santa Barbara traffic crossing 101 diverted to Garden
2) Chapala traffic crossing 101 diverted to State
3) Westbound 101 traffic heading Downtown divides evenly between Santa Barbara and Chapala; currently uses Santa Barbara (40%), State (23%), Chapala (20%), and Bath (17%),
4) Eastbound 101 traffic heading Downtown divide evenly between Garden, State and Castillo/Haley/Chapala; currently uses Santa Barbara (56%), State (24%), and Chapala (20%)

Outbound Traffic

1) Traffic crossing 101 divided as follows: State (60%), Garden (40%); traffic currently uses Anacapa (41%), State (38%), and Chapala (20%)

2) Traffic heading eastbound on 101 divides evenly between Garden, State, De La Vina/Haley/Castillo/Montecito and Milpas; traffic currently uses Anacapa (69%), State (15%), Chapala (16%)

3) State Street traffic heading westbound on 101 divides evenly between Anacapa and Chapala Streets

The existing traffic and the reassigned traffic is shown in Table 7. The table also shows the impact of the Presidio restoration by reassigning 30% of existing and reassigned northbound traffic on Santa Barbara Street to State and Chapala Streets. The result is that there is a major traffic increase on Garden Street, and smaller increases on Chapala (northbound), State (southbound), De La Vina and Haley Streets. A major traffic decrease occurs on Anacapa Street, and smaller losses occur on Santa Barbara, State (northbound) and Chapala (southbound).

Table 7 reflects the changes based on existing volumes. Two additional changes had to be made prior to the reassignment of trips in Scenario 6. First, the traffic had to be increased to account for traffic growth due to build-out and external trip growth. Reassigned volumes were thus multiplied by 1.222 to account for this. And finally, the future trips to and from the department stores and hotel/conference center had to be manually reassigned. Trips that crossed 101, which had previously been assigned to Anacapa, Chapala and Santa Barbara Streets were all assigned to State Streets. The other reassignment was for outbound trips on 101 that previously followed Anacapa on Chapala to access the freeway. These were divided evenly between Garden, State, De La Vina/Haley/Castillo/Montecito and Milpas.

After these adjustments, the following changes in peak hour traffic volume were estimated at points just north of the 101 freeway:

Table 7

ESTIMATED CHANGES IN PM PEAK HOUR TRAFFIC DUE TO CROSSTOWN FREEWAY

INBOUND TRAFFIC (NORTHBOUND)

	Existing Traffic[1,2]				Reassigned Traffic[2]				
		From 101				From 101			
Street	Across 101	WB	EB	Total	Across 101	WB	EB	Total	Change
Garden	—	—	—	—	110(77)	—	36	146(113)	+146(+113)
Santa Barbara	110(77)	182(128)	60(42)	352(247)	—	229(160)	—	229(160)	-123(-87)
State	125(147)	104(140)	26(38)	255(325)	176(209)	—	36	212(245)	-33(-80)
Chapala	51(62)	92(110)	22(28)	165(200)	—	229(298)	—	229(298)	+64(+98)
Bath	—	80	—	80	—	—	—	0	-80
Castillo/Haley/ Chapala or Bath	Not Included				—	—	36	36	+36
TOTAL	286	458	108	852	286	458	108	852	

OUTBOUND TRAFFIC (SOUTHBOUND)

	Existing Traffic[1]				Reassigned Traffic				
		From 101				From 101			
Street	Across 101	WB	EB	Total	Across 101	RB	EB	Total	Change
Garden	—	—	—	—	158	106	—	264	+264
Anacapa	164	295	76	535	—	—	94	94	-441
State	152	64	35	251	238	106	—	344	+93
Chapala	80	66	40	186	—	—	57	57	-129
De La Vina/Haley/ Castillo	Not Included				—	106	—	106	+106
Milpas	Not Included				—	107	—	107	+107
TOTAL	396	425	151	972	396	425	151	972	

[1] Based on Caltrans Counts in 1977.

[2] Numbers in parentheses are estimates that assume the Presidio restoration and closing of Santa Barbara Street at Canon Perdido.

Street	Change in Peak Hour Traffic NB	SB
Garden	+138	+345
Santa Barbara	-109	--
Anacapa	--	-617
State	-86	+148
Chapala	+111	-183
Bath	-98	--
De la Vina/Haley/Castillo	--	+152
Castillo/Haley/Chapala	+44	--

For each street, these volume changes were gradually reduced as one got further away from the freeway until there were no changes north of Figueroa Street (for Santa Barbara, the impact ended at Canon Perdido since the street was closed there). The assumed reductions in traffic diversions were as follows:

North of Following Cross-Street	% of Traffic Change Diverted
101 Freeway	100
Montecito	90
Haley	70
Cota	60
Ortega	50
De la Guerra	40
Canon Perdido	30
Carrillo	10
Figueroa	0

The changes in northbound traffic were added or subtracted from through and turning volumes proportionally. Changes in southbound traffic were added or subtracted from through trips only since the trips affected were heading directly to the freeway or south of it.

After the reassignment of traffic, level of service was recalculated for those signalized intersections affected by the reassignment process. This included most intersections south of Anapamu Street. The results are shown in Table 8 relative to the results of Scenario 4.

Table 8

TRAFFIC IMPACTS OF THE CROSSTOWN FREEWAY

Intersection	Scenario 4 (1995 with Presidio) V/C (%)	LOS	Scenario 6 (1995 with Presidio & Freeway V/C (%)	LOS
Santa Barbara Street				
Haley	77	C	74	C
Cota	43	A	41	A
De la Guerra	43	A	42	A
Anacapa Street				
Haley	82	D	68	B
Cota	60	B	48	A
Ortega	49	A	38	A
De la Guerra	70	B	61	B
Canon Perdido	55	A	49	A
Carrillo	85	D	83	D
State Street				
Haley	82	D	88	D
Cota	93	E	91	E
Ortega	65	B	61	B
De la Guerra	52	A	50	A
Canon Perdido	72	C	71	C
Carrillo	61	B	60	A
Figueroa	61	B	60	B
Chapala Street				
Haley	76	C	77	C
Cota	84	D	86	D
Ortega	64	B	67	B
De la Guerra	44	A	45	A
Canon Perdido	55	A	56	A
Carrillo	115	E	116	E
Figueroa	45	A	45	A
De la Vina Street				
Haley	54	A	54	A
Carrillo	71	C	72	C
Haley/Bath	96	E	103	E
Haley/Castillo	82	D	91	E
Castillo/101 SB	88	D	76	C

Overall, there was relatively little change in intersection operations. On State and Chapala Streets, one direction had a traffic increase while the other direction had a traffic decrease. These tended to balance each other, and overall intersection level of service changed relatively little. The only major changes occurred on Anacapa, Haley, and Castillo Streets. Much traffic was diverted from Anacapa Street, and the Haley/Anacapa intersection improved from a level of service D to B. However, the Haley/Castillo intersection went from D to E as it attracted traffic from Downtown heading east (south) on Route 101. The Castillo/101 SB intersection improved because the freeway on-ramp will be closed. However, the Castillo/Montecito intersection (south of the study area) will worsen significantly since southbound Castillo traffic getting on 101 southbound will now have to use this intersection to turn left.

3. TRAFFIC IMPROVEMENT STRATEGIES

FUTURE CONDITIONS AT EXISTING SIGNALIZED INTERSECTIONS

The following table summarizes the results of the previous chapter's analysis of future levels of service in Downtown Santa Barbara.

Table 9

Number of Signalized Intersections Wity Each Level of Service					
Level of Service	1981	1985	1995 w/o Presidio, w/o Freeway	1995 w/Presidio, w/o Freeway	1995 w/Presidio, w/Freeway
A	41	37	24	24	26
B	15	9	14	13	12
C	1	12	7	5	6
D	0	2	11	11	8
E	0	1	5	7	8
Total	57	61	61	60	60

The City of Santa Barbara desires to maintain a level of service B at all intersections. Level of service C is considered acceptable only in the instances where mitigation to level B is economically or physically not feasible. In no case will level of service D or lower be deemed acceptable.[1]

Figure 22 shows those intersections which are projected to have a level of service C or worse by 1985 or 1995. Altogehter, 24 of the 61 intersections analyzed are included, and all but two of these intersections are on either Mission, Carrillo,

---

[1] Letter to JHK & Associates from R.W. Puddicombe, Director of Public Works, June 10, 1981.

jhk & associates

Figure 22
Intersections with a Projected
Level of Service of C or Worse in 1995
(Worst Case Scenario)

Haley, or State Streets.

The analysis did not examine conditions at those intersections without existing or planned signals. By 1995, several other intersections may require signals, particularly along De La Vina and Garden Streets. This issue is discussed in a later section.

IMPROVEMENT STRATEGIES CONSIDERED

In developing strategies to improve future traffic conditions, low-cost localized improvements to traffic operations were emphasized. Recommended strategies are primarily parking removal, lane configuration changes, signal phasing changes, and roadway widenings which cause little disruption. Major roadway widening projects which require extensive right-of-way acquisition were not considered.

Even the recommended improvement tactics, however, will require the City to weigh tradeoffs and make new policy decisions. In particular, many of the improvement strategies rely upon the elimination of parking on both commercial and residential streets. This tradeoff between providing convenient parking for local residents and businesses and improving overall traffic flow is addressed in this report. Ultimately, however, policy decisions must be made that reflects the City's evaluation of this tradeoff.

Strategies to reduce vehicular demand, such as improved transit service and ridersharing incentives, were also considered in the analysis. However, the overwhelming majority of trips to, from, and within Downtown are made by automobile. Thus, extremely large increases in transit usage, carpooling, bicycling, and walking must be achieved before a major reduction in traffic is achieved. Santa Barbara has already made a major commitment to expanding its transit system and providing bicycle facilities,

and substantial usage of these modes has been assumed in the calculations of future traffic growth, since the future projections are based on current travel patterns. Also, as was pointed out in Chapter 2, the trip generation rates used to estimate the traffic caused by the proposed department stores are substantially below those typically used to analyze free-standing stores in suburban locations. Rather, the rates reflect the higher transit usage and walking reliance that are characteristic of large downtowns.

Major decreases in the amount of vehicular traffic due to alternative modes are thus unlikely. In the 1979 Transportation Management Implementation Study, the most comprehensive management program, which included major auto disincentives through parking management, was estimated to reduce daily CBD trips by only up to 3%. Still the cost of the program in 1979 was estimated to be $6.4 million in capital costs, and $1.4 million in annual operating costs.[1] Furthermore, a 3% traffic decrease is relatively insignificant in terms of reducing traffic congestion; to improve the traffic level of service from C to B, an approximately 10% reduction is required on the average.

A more modest improvement program that lacked major auto disincentives would naturally have a smaller impact on overall traffic levels. Improvements such as the Downtown People Mover, and ridersharing and bicycling programs are warranted for a wide variety of reasons, including improved mobility and convenience, their cost efficiency compared to auto usage, and their collective impact on reducing traffic levels, air pollution, and energy usage. However, the impact of these improvements on traffic flow, short of introducing major auto disincentives, would be small relative to what can be achieved through focused

---

[1] DeLeuw Cather & Company, Santa Barbara Transportaiton Management Implementation Study; Technical Appendix (February, 1979), p. C-9

traffic improvements at congested locations. This latter approach has thus been emphasized, with the understanding that substantial efforts to encourage transit use, bicycling and ridersharing are ongoing, and that these efforts assist in reducing the rate of future traffic growth.

RECOMMENDED IMPROVEMENTS AND IMPACTS

Table 10 lists the 24 intersections where levels of service C or worse are projected, proposed improvements to these intersections, and the resulting levels of service. Level of service at 15 of the 24 intersections has been improved to A or B. Of the remaining nine intersections, five would operate at level of service C, three would operate at level of service D, and one would operate at level of service E. For these intersections, there was no feasible way to further improve the level of service short of implementing highly disruptive street widenings. Figure 23 shows those intersections that would still be operating at level of service C or worse.

Mission Street Intersections

The major improvement made on Mission Street is to remove parking between State Street and De la Vina Street so that two through lanes can be provided in each direction from Route 101 to State Street, including the approach to State Street. About 53 parking spaces will be lost as a result. Although these spaces are used heavily, parking usage on adjacent cross-streets is quite low and the general area has ample on-street parking. Also recommended is a widening of Mission Street by four feet so that four 10-foot traffic lanes can be made available. This would cost about $60,000. However, it would be feasible to provide four 9-foot lanes on the existing street, as is currently done west of De la Vina. Traffic congestion

Table 10. PROPOSED INTERSECTION IMPROVEMENTS

SIGNAL	PROJECTED OPERATION (1995) (WORST CASE) LOS	SATURATION	PROPOSED IMPROVEMENTS	RESULTING OPERATION LOS	SATURATION	EST. COST ('000's OF $)	COMMENTS
Mission St. Intersections							
Mission/State	E	92%	Remove parking on both sides of Mission west of State St.; widen Mission 2 ft. on each side; remove parking on westbound Mission St. approach east of State St.; make two 10' through lanes in each direction on Mission.	B	69%	24	Widening can be avoided by having 9' lanes on Mission Street.
Mission/Chapala	D	88%	Remove parking on both sides of Mission on each approach; widen Mission by 2 ft. on each side; make two 10' through lanes in each direction on Mission; remove parking on west side of Chapala St. to make left-turn lane.	A	57%	24	Widening can be avoided by having 9' lanes on Mission Street.
Mission/De la Vina	E	92%	Remove parking on both sides of Mission east of De la Vina, widen Mission by 2 feet on each side; make two 10' through lanes in each direction on Mission; remove parking on De la Vina approach to make a right-turn lane, a through lane, and a through-left-turn lane.	B	67%	24	Widening can be avoided by having 9' lanes on Mission St.
Carrillo St. Intersections							
Carrillo/Santa Barbara	C	76%	Remove parking on one side of Carrillo St. near intersection; add lane to EB Carrillo approach to make 2 through lanes and a left-turn lane; remove parking from east side of Santa Barbara St. and add right-turn lane.	B	68%	2	Carrillo St. improvements do not improve level of service, but will allow left turns to clear the intersection. The E-W critical movements do not change.

Table 10. PROPOSED INTERSECTION IMPROVEMENTS

SIGNAL	PROJECTED OPERATION (1995) (WORST CASE) LOS	SATURATION	PROPOSED IMPROVEMENTS	RESULTING OPERATION LOS	SATURATION	EST. COST ('000's OF $)	COMMENTS
Carrillo St. Intersections (cont.)							
Carrillo/Anacapa	D	85%	Remove parking on east side of Anacapa approach and add a left-turn lane; prohibit left-turns from Carrillo.	B	67%	2	Removing parking from one side of Carrillo St. to add a separate left-turn lane and providing a left-turn signal phase would result in a level of service D and an 81% saturation.
Carrillo/Chapala	E	116%	Make Chapala St. one-way northbound north of Canon Perdido St.; add fifth approach lane NB on Chapala so there are three through lanes and two turning lanes; remove parking on north side of Carrillo St. east of Chapala and add right-turn lane. Make middle EB lane on Carrillo a left-through lane and make a left-turn permissive phase.	D	80%	35	Reconstructing Carrillo St. to provide two left-turn lanes and two through lanes would provide a level of service C and a 75% saturation.
Carrillo/De la Vina	C	72%	Remove parking on both sides of Carrillo west of De la Vina to make an EB right-turn lane	B	68%	2	
Carrillo/Bath	E	91%	Remove parking on both sides of Carrillo St. between Bath and De la Vina to make three WB lanes on Carrillo west of De la Vina.	C	71%	4	There may be a need for a left-turn phase which would increase saturation to 75%.
Carrillo/Castillo	D	82%	Remove parking on west side of Castillo approach to add a right-turn lane; add right-turn lane to EB Carrillo approach, using space made available by removing left-turn lane on same approach.	A	59%	2	Left-turn lane on EB Carrillo is unnecessary once Castillo is made one-way southbound. Restriping can provide a right-turn lane instead.

Table 10. PROPOSED INTERSECTION IMPROVEMENTS

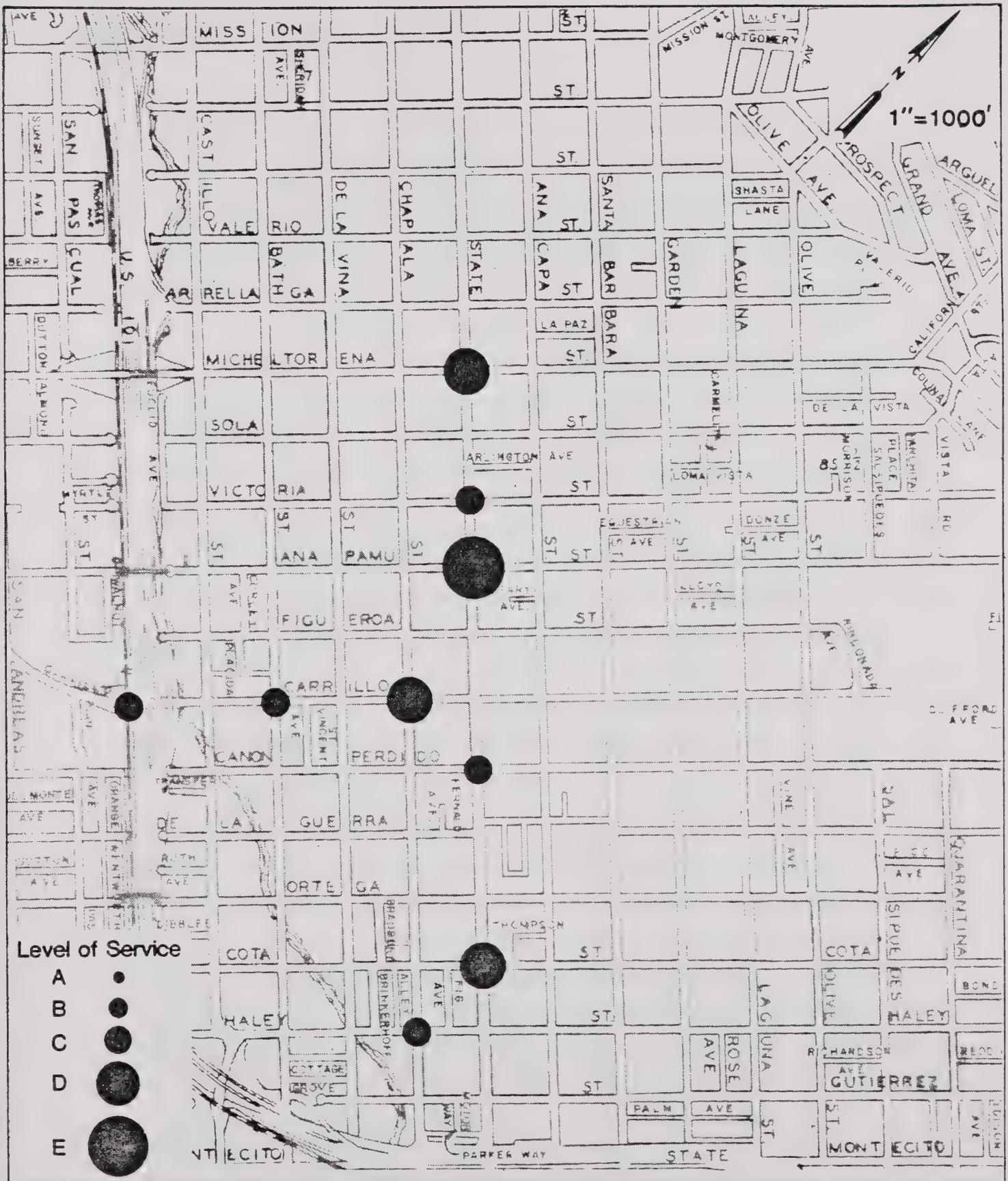
SIGNAL	PROJECTED OPERATION (1995) (WORST CASE) LOS	SATURATION	PROPOSED IMPROVEMENTS	RESULTING OPERATION LOS	SATURATION	EST. COST ('000's OF $)	COMMENTS
Carrillo St. Intersections (cont.)							
Carrillo/101 NB	C	76%	Add third lane on west side of off-ramp.	B	62%	57	Existing bridge just east of intersection requires ramp widening to be done on west side. This will reduce left-turn storage capacity between the ramps.
Carrillo/101 SB	D	86%	Widen Carrillo St. by 5' between ramps and restripe so there are 3 WB through lanes plus left-turn lanes; restripe Carrillo from ramp to San Andreas St. for five 10' lanes; add third lane on east side of off-ramp; add left-turn signal phase, widen EB approach by 10' to provide right-turn lane.	C	71%	121	No other feasible improvements
Haley St. Intersections							
Haley/Santa Barbara	E	91%	Remove parking on both sides of Haley to make two lanes in each direction; Remove parking on both sides of Santa Barbara approach and install turning lanes.	B	66%	4	
Haley/Anacapa	D	82%	Remove parking on both sides of Haley to make two lanes in each direction; remove parking on east side of Anacapa approach to make left-turn lane.	A	53%	4	
Haley/State	D	88%	Remove parking on both sides of Haley to make two lanes in each direction; remove parking on west side of SB State approach to add right-turn lane.	B	68%	4	

Table 10. PROPOSED INTERSECTION IMPROVEMENTS

SIGNAL	PROJECTED OPERATION (1995) (WORST CASE) LOS	SATURATION	PROPOSED IMPROVEMENTS	RESULTING OPERATION LOS	SATURATION	EST. COST ('000's OF $)	COMMENTS
Haley St. Intersections							
Haley/Chapala	C	77%	Remove parking on both sides of Haley to make two lanes in each direction; remove parking from one side of each Chapala approach to add right-turn lane on NB approach, and left-turn lane on SB approach; add left-turn signal phase for SB Chapala approach.	C	72%	34	Not providing left-turn phase will increase delay for left-turning vehicles, but will increase overall level of service to B and reduce saturation to 69%.
Haley/Bath	E	103%	Remove parking on both sides of Haley to make two lanes in each direction, including an EB left-turn lane; add left-turn signal phase.	B	63%	34	
Haley/Castillo	E	91%	Make both northbound lanes on Castillo left-turn lanes onto 101; restripe NB Castillo right-turn lane into two 10' lanes that lead into both EB Haley lanes. Restripe Haley so that there are three WB lanes approaching intersection (widening into island 3-5 ft. may be necessary), and allow dual left-turn; install yield sign on EB Haley prior to turn lanes from Castillo joining Haley.	A	52%	7	
Additional State Street Intersections							
State/Cota	E	93%	Remove parking on right side of State St. approaches and add right-turn lanes.	D	86%	2	Having only one through lane on State acts as a constraint; no feasible improvements.
State/Anapamu	E	95%	--	E	95%	--	"
State/Canon Perdido	C	72%	--	C	72%	--	"
State/Victoria	D	82%	Remove parking on EB Victoria approach and add a left-turn lane.	C	79%	--	"
State/Micheltorena	D	80%	--	D	80%	--	"

Table 10. PROPOSED INTERSECTION IMPROVEMENTS

SIGNAL	PROJECTED OPERATION (1995) (WORST CASE) LOS	SATURATION	PROPOSED IMPROVEMENTS	RESULTING OPERATION LOS	SATURATION	EST. COST ('000's OF $)	COMMENTS
Other Intersections							
Castillo/101 SB	D	88%	Widen Castillo by 3-5 ft. and add left-turn lane to SB approach and right-turn lane to NB approach; add 3rd lane to off-ramp; add left-turn phase.	B	69%	107	Lanes on Castillo would become 10' wide. Further improvements are not feasible.
Cota/Chapala	D	86%	Remove parking from east side of NB Chapala approach and add right-turn lane; change lane designations on westbound Cota approach to a right-turn lane and a through-left lane.	B	67%	2	



jhk & associates

Figure 23
Intersections With a Projected Level of Service of C or Worse in 1995 (if all Recommended Improvements are Implemented)

would be slightly worse, but costs would be reduced substantially and the sidewalks wouldn't have to be narrowed. As a result of these actions and minor restriping on the De la Vina and Chapala approaches, the levels of service for the De la Vina, Chapala and State Street intersections will increase from D or E to A or B.

Carrillo Street Intersections

Improvements to Carrillo Street are specific to each intersection. At the Santa Barbara intersection, the recommended strategy is to remove one side of parking on the Carrillo approaches so that a separate left-turn lane can be added, and to remove parking from the right side of the Santa Barbara approach so a right-turning lane can be installed. About 12 parking spaces would be eliminated, but a level of service B would result.

At Anacapa Street, left-turns from Carrillo would be prohibited, and four parking spaces on the left side of the Anacapa approach would be eliminated in order to provide a left-turn lane. Level of service would improve from D to B. An alternative to prohibiting left turns is to remove around eight parking spaces on the north side of Carrillo so that a left-turn lane could be provided, along with installing a new left-turn signal phase. However, a level of service D would result from this scheme and there would be little overall improvement other than reducing the delay incurred by left-turning vehicles.

Carrillo and Chapala is projected to be the most congested intersection in Downtown Santa Barbara. Several improvements are recommended. First, the one-way portion of Chapala Street should be extended one block south to Canon Perdido. This would allow Chapala to have five northbound lanes approaching Carrillo, including left-turn and right-turn lanes. This change would also direct some southbound Chapala traffic to De la Vina Street, where it can be accommodated better, although

such a diversion was not assumed in the calculations. A second recommended change at this intersection is to remove north side parking on the westbound Carrillo approach so that a right-turn lane can be added. Finally, eastbound Carrillo should be restriped for a left, left-through, and through lane and left-turns be permitted after the protected left-turn phase ends. This intersection is particularly congested because most of the traffic to and from the hotel/conference center and two of the three department stores pass through this intersection.

Further west on Carrillo, the removal of all 16 parking spaces on Carrillo between De la Vina and Bath is recommended. This would provide three westbound lanes west of De la Vina. Adding a separate right-turn lane on Castillo Street is also recommended. Significant improvements result, although the Bath Street intersection would operate at a level of service C (improved from "E").

At the Carrillo/101 intersections, Carrillo Street should be widened between the ramps so that three westbound through lanes plus a left-turn lane are provided. West of 101, Carrillo is wide enough (55 feet) to restripe for 3 westbound lanes and two eastbound lanes, so the third lane can continue until San Andreas Street. Widening just west of 101 is recommended so an eastbound right-turn lane can be installed. In addition, a third lane would be added to both off-ramps and a separate left-turn signal phase should be added for westbound Carrillo traffic. As a result of these changes, the northbound ramp intersection would have a level of service B, and the southbound ramp intersection would have a level of service C.

Haley Street Intersections

The basic improvement proposed for Haley Street is to remove parking between Garden and Bath Streets so that two

through lanes are provided in each direction. This would cause a loss of 101 parking spaces on the street, which is quite substantial. Although this is not the area of Downtown with the greatest parking needs, parking is still in relatively short supply. However, the Redevelopment Agency plans to establish two off-street parking facilities on both sides of Haley Street around State Street. These facilities would have over 300 spaces among them, which would much more than offset the projected loss of parking on State Street when the Mall is extended as well as the loss of parking on Haley Street. Although the loss of parking on Haley Street is undesirable, it is the least disruptive way to improve conditions on Haley Street.

Other proposed changes along Haley Street include removing parking on State, Anacapa, Santa Barbara, Chapala, and Bath Streets to make turning lanes (resulting in an additional loss of around 20 spaces), and installing left-turn signal phases for southbound Chapala traffic and eastbound Haley traffic at Bath. At Castillo Street, Haley would be widened slightly (into the traffic island) so that there could be three westbound lanes and only one eastbound lane. The single eastbound lane would merge with the two lanes that feed into Haley from northbound Castillo. With all of these changes, all of the Haley Street intersections except Chapala would operate at level of service A or B.

Additional State Street Intersection

Five additional State Street intersections are projected to have a level of service C or worse. Unfortunately, only minor operational improvements can be made. In all five cases, the principal constraint is the single through lane on the State Street Mall, and it is not feasible to change this. At all five intersections, the future level of service will remain at C or worse.

Other Intersections

At the Castillo/101 SB intersection, Castillo Steet should be widened by 3 to 5 feet so that a northbound right-turn lane and a southbound left-turn lane can be provided. A left-turn signal phase is also required. Finally, a third lane must be added to the 101 off-ramp. At Cota and Chapala, removing parking from the northbound Chapala approach to add a right-turn lane, and changing the lane designations on Cota results in level of service improvement from D to B.

COSTS

In about half the cases, the costs of the intersection improvements are relatively minor, since only new signing and striping is required. However, at the other intersections, costs are much higher due to street widening and signal improvements. In estimating costs in Table 10, the following assumptions were used:

Improvement	Cost
Intersection approach restriping	$2,000
Street restriping	$2,000/block
Island/sidewalk removal	$1.50/sq.ft.
Retaining wall removal	$50/linear ft.
Paving	$4/sq.ft.
Curb installation	$12/linear ft.
Retaining wall installation	$250/linear ft.
Left-turn signal phasing installation	
one direction	$30,000
two directions	$35,000

The total cost of recommended improvements is estimated to be $495,000. This reduces to $435,000 if Mission Street

widening is not done and 9-foot lanes are used. More than half of the total amount is for improvements at three intersections with freeway ramps, and for which CALTRANS would have much of the responsibility. In addition to these costs the City will have to install many new traffic signals in Downtown at a cost of close to $1 million. This is discussed in the following section.

IMPROVEMENTS AT NON-SIGNALIZED INTERSECTIONS

The previous sections discussed only those intersections where signals currently exist or are programmed for installation. The projected increases in traffic will also make signals necessary at around 15 to 20 additional intersections in the Downtown area. Based on MUTCD warrants, almost all of the intersections on Garden between Gutierrez and Micheltorena will warrant signals (assuming the Presidio restoration is completed) and all of the intersections on De la Vina between Micheltorena and Canon Perdido Streets will warrant signals. Sola and Gutierrez Street intersections with Chapala, State, Anacapa, and Santa Barbara Streets are also likely signal locations. If 20 additional intersections must be signalized, the cost will be around $1 million.

Except for the Garden Street intersections, the new signalized intersections will all operate at acceptable levels of service. On Garden Street, the Presidio restoration and the freeway project will cause a substantial traffic increase, especially northbound due to the closing of Santa Barbara Street. In Scenario 6, the following peak hour approach volumes are estimated for Garden Street:

Intersection	NB	SB
Haley	403	359
Cota	541	500
Ortega	697	452
De la Guerra	725	483
Canon Perdido	973	449
Carrillo	911	287
Figueroa	649	318
Anapamu	583	392
Victoria	591	407
Sola	535	407
Micheltorena	475	331
Valerio	323	331
Mission	368	309

Garden Street currently has one lane in each direction, which will be inadequate at the busiest intersections. A desirable strategy is to remove parking from the east side of Garden from Haley to Carrillo Street and make two northbound lanes, with the left lane becoming a left-turn lane at Carrillo Street. This would insure an adequate level of service at all Garden Street intersections. An alternative strategy is to make Laguna and Garden Street a one-way couplet. This would also provide adequate capacity since Laguna Street has excess capacity. Under this scheme, it would be most desirable to make Laguna the northbound street since traffic from 101 enters directly onto Laguna. Also, this would provide an alternating directional scheme on north-south streets since Santa Barbara Street is one-way northbound.

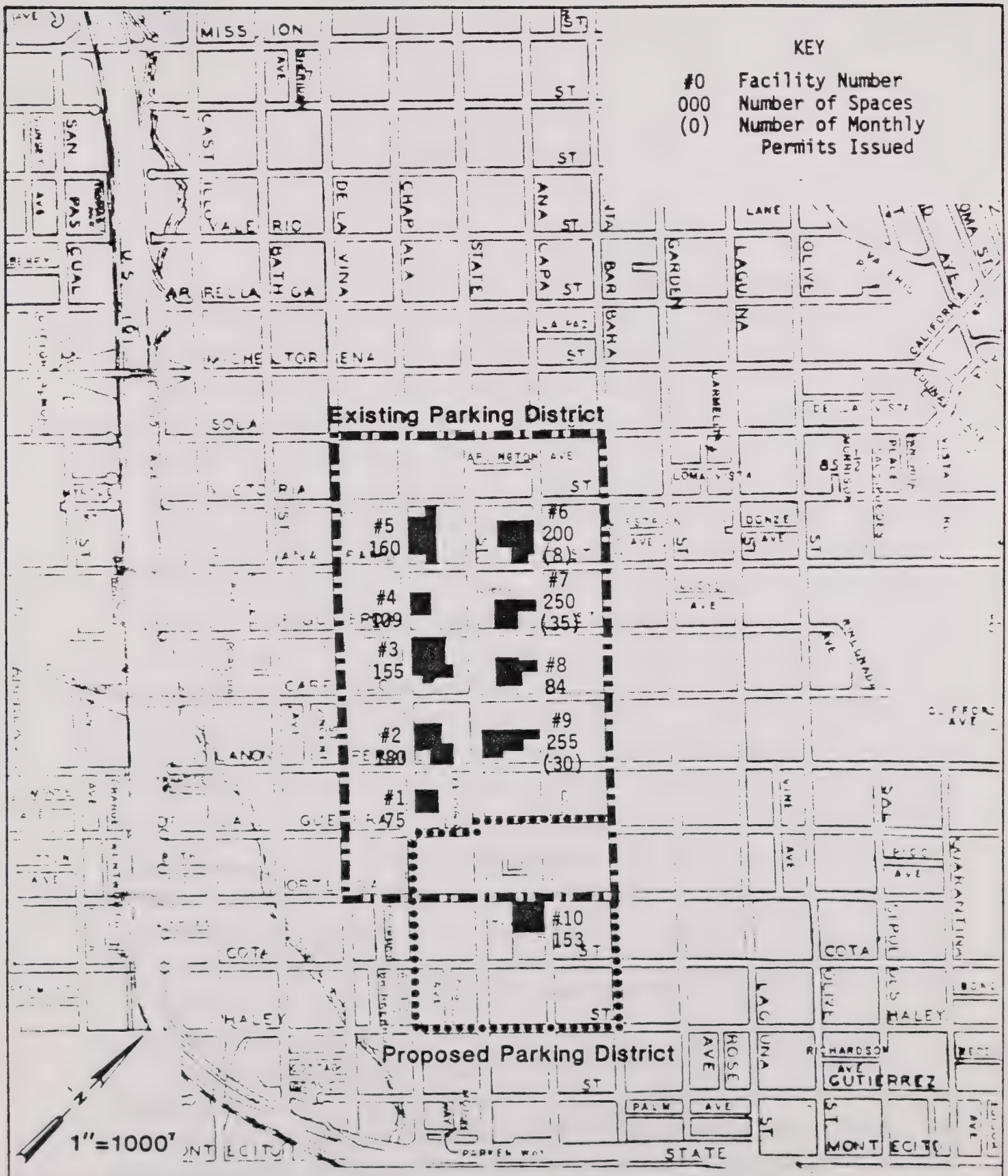
4. PARKING CONDITIONS

DOWNTOWN PARKING DISTRICTS

In response to the need for additional parking in the CBD core area, the City of Santa Barbara established a Downtown Parking District in 1961. Financed by the sale of Municipal Assessment Bonds, four public parking lots were established in the four blocks bounded by State, Chapala, Anapamu, and De la Guerra Streets. In 1967, five additional facilities were acquired, mostly on the east side of State Street, and a second parking district was formed. These two districts were subsequently consolidated. In September, 1980, the City opened a tenth parking facility which had been acquired, constructed, and thus far operated with Redevelopment Agency Funds. A proposal to establish a third parking district to cover the costs incurred in establishing and operating this new facility had been proposed, but was rejected by the City Council. Figure 24 shows the existing and proposed Parking District boundaries, and the locations of the ten parking facilities. Altogether, the ten facilities contain about 1620 parking spaces.

The existing Downtown Parking District is self-supporting and derives revenues primarily through user fees and two assessments levied in the District. The District's costs and revenues are discussed in greater detail in Chapter 5, when the ability of the District to finance necessary improvements is considered.

Properties within the parking district are totally or partly exempt from the off-street parking requirements contained in the City's zoning code. Zones of benefit have been established as a basis for apportioning the assessment burden among properties within the District. Those properties on blocks with public parking



jhk & associates

Figure 24

Existing and Proposed Parking Districts and Facilities

facilities are in a 100% zone of benefit and are totally exempt from the off-street parking requirements (and pay the highest relative assessment rates). Other properties are in zones of benefit ranging from 40% to 2%, and must satisfy between 60% and 98% of the parking requirement for their properties.

PARKING SUPPLY

Table 11 shows the number of parking spaces in the Downtown study area, including curb spaces and off-street parking lots. The curb space inventory was derived from data compiled by the Public Works Department and supplementary field checks done by JHK. The off-street inventory was taken primarily from the 1979 Transportation Management Implementation Study. Off-street spaces in the northern part of the study area, which was not included in the 1979 study, were estimated from aerial photos.

The total parking supply is estimated to be 16,807 spaces. About 7000 of these spaces are located in a 10-block by 4-block core area centered on Carrillo and State Streets where much of Downtown's commercial activity is located. Within this core area, off-street parking accounts for 76% of the total parking supply and the curb parking supply is mostly restricted to 90-minute parking. Outside the core area, which is largely residential, unrestricted curb spaces provide just over half of the parking available.

Curb Spaces

Nearly half of the total parking supply consists of curb spaces, although curb spaces comprise a much smaller proportion of the total in the core area. Until the fall of 1980, Santa Barbara had 15-minute, one-hour, and two-hour posted time restrictions. At that time, all one-hour and two-hour restrictions

TABLE 11

DOWNTOWN PARKING SUPPLY

Curb Spaces	Core Area*	Outside Core Area	Total
15-minute limit	147 (2%)	82 (1%)	229 (1%)
90-minute limit	1,063(15%)	239 (2%)	1,902(11%)
Yellow (loading zones)	101 (1%)	47 (0%)	148 (1%)
White (passenger zones)	56 (1%)	50 (1%)	106 (1%)
Blue (handicapped zones)	6 (0%)	11 (0%)	17 (0%)
Unrestricted	309 (4%)	4,949(51%)	5,258(31%)
Total On-Street	1,682(24%)	5,978(61%)	7,660(46%)
Off-Street Spaces			
Public lots (short-term)	1,548(22%)	0	1,548 (9%)
Public lots (permits)	73 (1%)	0	73 (0%)
Private lots	3,752(53%)	3,774(39%)	7,526(45%)
Total Off-Street	5,373(76%)	3,774(39%)	9,147(54%)
Grand Total	7,055(100%) (42%)	9,752(100%) (58%)	16,807(100%) (100%)

*40 square-block area (0.4 square miles) centered on Carrillo and State and bounded by Micheltorena, Santa Barbara, Haley and De la Vina Streets.

were changed to a uniform 90-minute restriction. Figure 25 shows the locations of blocks having 90-minute parking restrictions, as well as blocks with no parking permitted and blocks having mostly 15-minute parking restrictions. The restricted area forms roughly a diamond shape whose axes are State and Carrillo, corresponding roughly to the area with commercial development. The southeastern part of the study area, where additional commercial activity is located, also has several blocks with 90-minute restrictions.

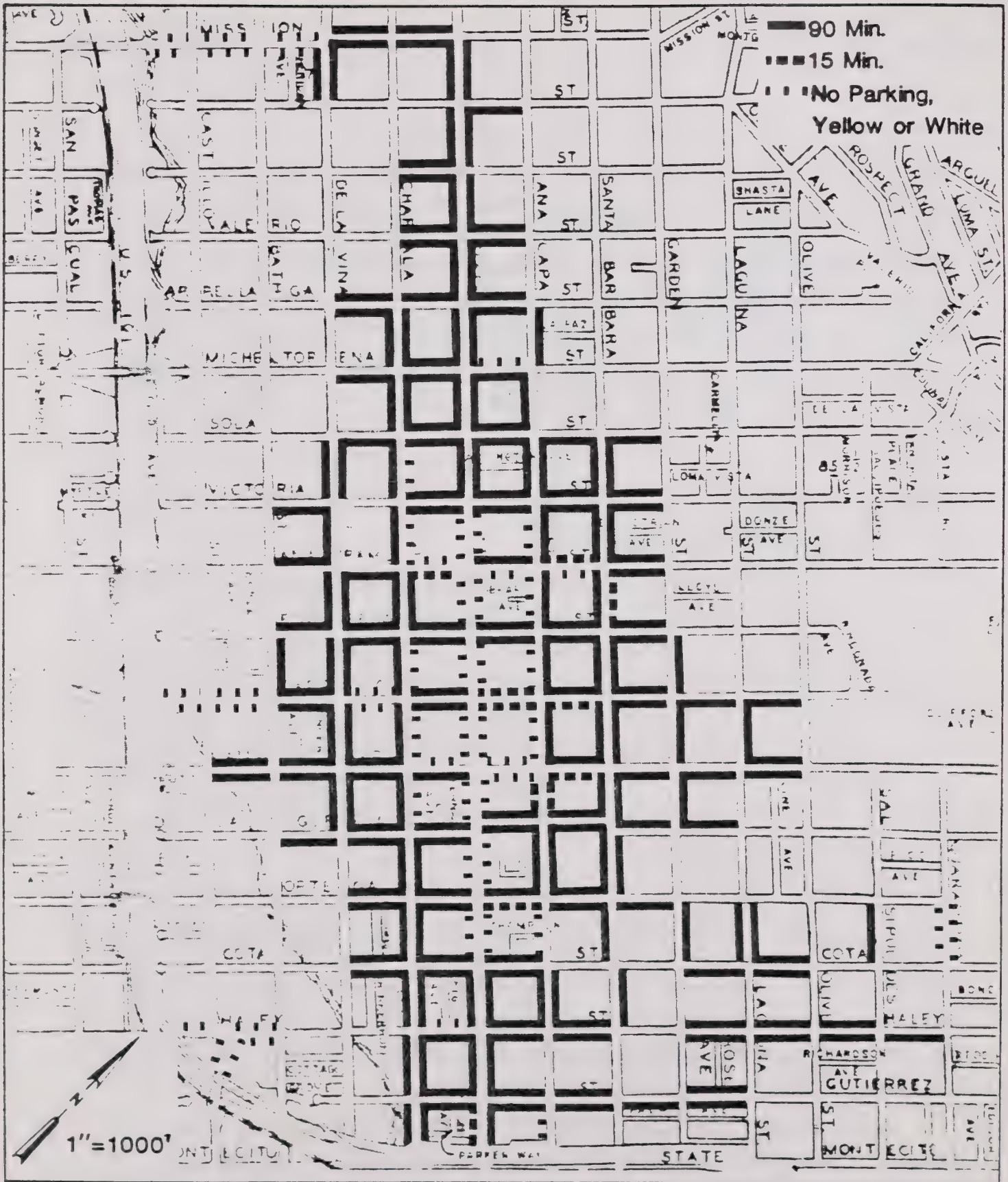
Off-Street Spaces

Public Parking Facilities

The ten parking facilities operated by the Downtown Parking District (see Figure 24) contain 1620 parking spaces. The first 90 minutes of parking are free. The next hour costs $.50, and each additional hour costs $1.00, up to a maximum daily charge of $8.50. Parking rates were increased on March 1, 1979. Prior to that time, each additional hour was $.45 up to a maximum of $4.00. Each facility has self-operating ticket-issuing machines and gates and an attendant to collect fees from exiting vehicles.

Approximately 75 monthly permits at $60 per month are also sold for use in Facilities #6, 8, and 9. Prior to 1979, the monthly permit fee was $35, and there were over 200 monthly permits sold. However, many permit users dropped out following the rate increase since private parking is generally cheaper. No additional monthly passes have been issued since 1979, although there have been some requests.

The Parking District plans to restripe the current parking lots in order to increase the number of spaces. Where a net gain can be realized, rows of 9-foot wide parking stalls will be restriped to 8½-foot width. This will result in a total of 1734 spaces, a 7% increase. In addition, there are plans



jhk & associates

Figure 25
Blocks with Restricted Curb Parking

to expand Lots #1 and 6, which will add an additional 70 spaces. A loss of 12 spaces in Lot #3 is also foreseen because of a projected expansion of the SBMTD bus terminal. Thus, the overall public off-street supply will probably total about 1,792 spaces within two or three years.

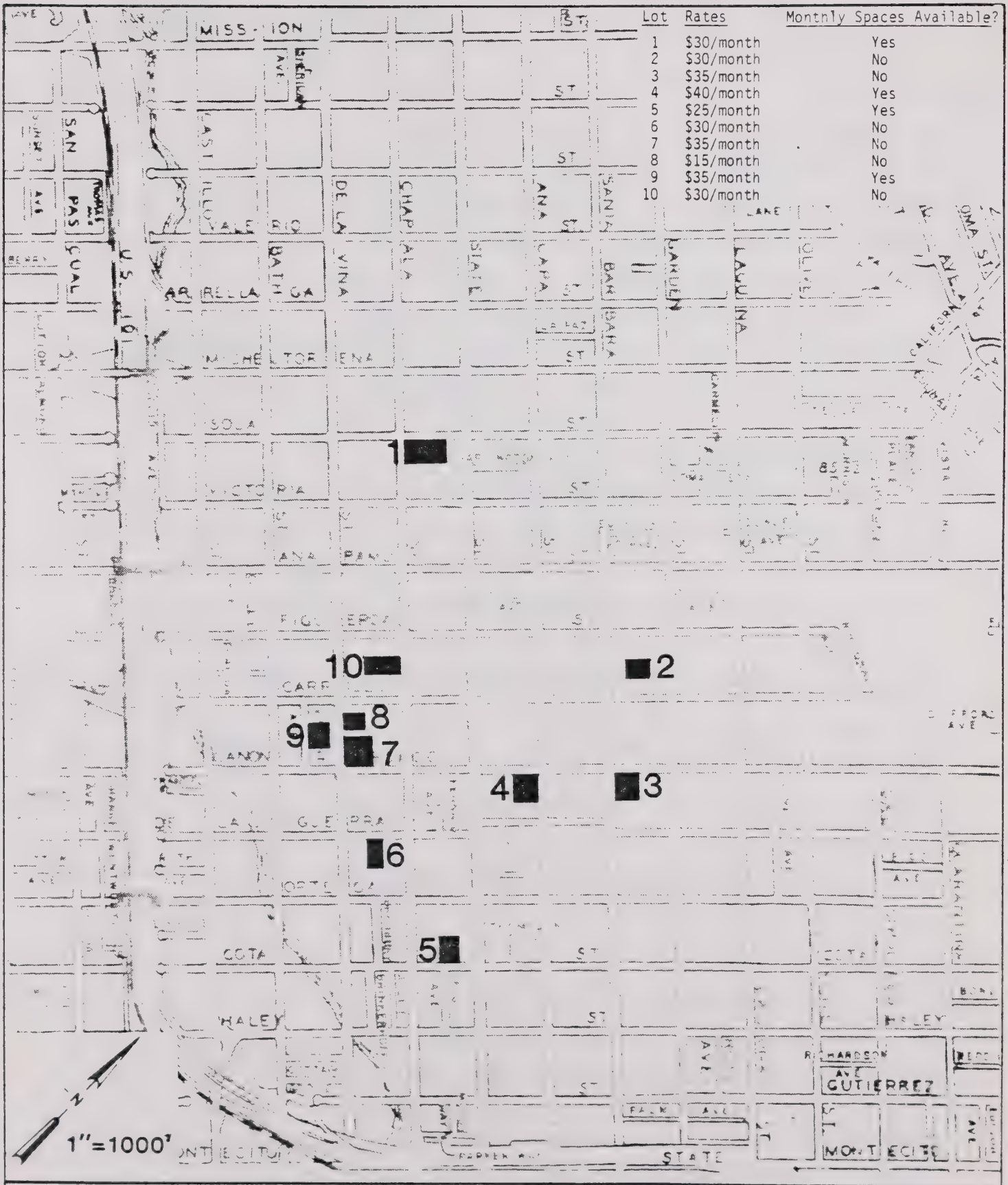
Finally, the Redevelopment Agency plans to build two new parking lots in the Lower State Street area near Haley Street. These lots will have a combined capacity of 310 spaces.

Private Off-Street Parking

There are approximately 7500 privately-owned parking spaces in the Downtown study area. The overwhelming majority of these spaces are for the customers and employees of the businesses which own or lease these spaces. There are also ten parking lots where spaces are rented to the general public mostly on a monthly basis. These lots, shown in Figure 26, were surveyed informally in May, 1981. Seven of these lots charge $30 or $35 per month ($1.50-$1.75 per day). One centrally located lot charges $40 per month, while a lot located several blocks south of the CBD core charges only $25 per month. One small lot on De la Vina charges only $15 per month, but this was acknowledged by even the owner as being a bargain. Two of the larger lots (#'s 1 & 4 in Figure 26) also allow daily and hourly parkers at $3/day or 70¢/hour.

PARKING ENFORCEMENT

The Santa Barbara Police Department normally employs five parking enforcement officers to enforce the 90-minute curb time limits. Some of the curb restrictions are located outside of the Downtown study area, so the Downtown parking enforcement level is roughly the equivalent of four full-time officers. On



jhk & associates

Figure 26
Private Parking Lots
With Monthly Parking
Available to the General Public

Saturdays, however, only one officer is on duty, and she works the CBD core area only. The annual cost of enforcement is about $120,000 including $95,000 for salaries and benefits and $25,000 for vehicle leasing and operation.

The parking enforcement officers issue about 4500 citations per month (about 210 per weekday), almost all for overtime parking. Regular patrol officers typically issue an additional 500 citations per month, citywide, but these are for no parking or hazardous parking violations rather than overtime parking.

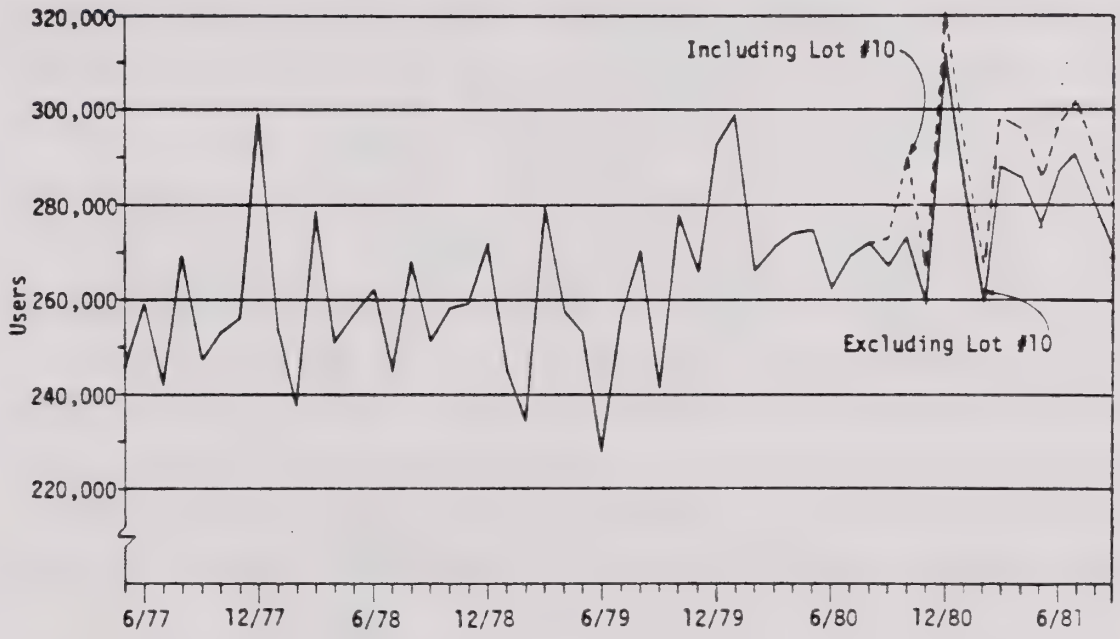
Parking fines in Santa Barbara are $10 for overtime parking (90-minute zones and 15-minute green zones), and $20 for yellow (loading) and red (no parking) zone violations. Parking fines currently generate about $380,000 a year of revenue for the City, considerably more than the cost of enforcement. This is also substantially higher than in previous years when Santa Barbara County administered the collection of parking fines and the adjudication of contested citations, and kept a share of revenues.

PARKING USAGE AND AVAILABILITY

Public Parking Facilities

In a typical month, about 280,000 cars park in the City's ten off-street parking facilities (about 11,900 per weekday). Figure 27 shows the monthly usage that has occurred over the past four years. There is considerable seasonal variation with the greatest demand occurring in December due to Christmas shopping. A smaller peak usually occurs in August when the annual Fiesta festival is held. Overall, however, usage was fairly level in 1977, 1978, and 1979, but increased by 7% in 1980. Usage in 1981 is thus far running about the same as last year.

In 1978, as part of the Transportation Management Implementation Study, a detailed analysis was made of how long people parked



jhk & associates

Figure 27
Total Monthly Users
of Public Parking Facilities

in the parking facilities. Since that time, the parking fee structure has been revised such that long-term parking is discouraged. The 1978 data has been revised based upon current revenue and usage data (the average revenue per user is now around $0.11 compared to $0.097 in 1978, but had the time distribution of parkers not changed, the average revenue per user would be about $0.16). The estimated current distribution of parkers by fee paid (excluding monthly permit holders) is:

Fee Paid	Time Parked (hrs.)	Percent of Parkers
Free	0-1½	89.7
$0.50	1½-2½	7.2
$1.50	2½-3½	1.7
$2.50	3½-4½	0.7
$3.50	4½-5½	0.3
$4.50	5½-6½	0.1
$5.50	6½-7½	0.1
$6.50	7½-8½	0.1
$7.50	8½-9½	0.1
$8.50	Over 9½	0.0

Within the large no fee category, the majority of parkers park for less than a half hour. Based on the 1978 data, the distribution of parkers who park for less than 90 minutes is estimated to be:

Time Parked	% of All Parkers
0-30 minutes	48%
30-60 minutes	27%
60-90 minutes	15%
	90%

The average car parks for 0.87 hours, so the 11,900 daily parkers occupy about 10,300 daily space-hours each day. The 73 monthly permit users occupy about 500 additional space-hours per day. From 8 AM to 6 PM, there are 16,210 available space-hours (1621 spaces X 10 hours), so overall parking space usage is about 67% (10,800 occupied space-hours/16,210 available space-hours). Average daily turnover (parkers per space) is about 7.3 (11,900 daily parkers/1621 spaces).

There is great variation in the above figures according to time of day and parking facility. The following data compares each parking facility according to average weekday turnover and peak occupancy (around 2 PM):

Parking Facility	# of Spaces	Weekday Usage	Turnover (Excluding Monthly Permit Users)	Peak Occupancy
1	75	830	11.1	100
2	180	1,801	10.0	100
3	155	1,650	10.6	100
4	109	1,246	11.4	100
5	160	1,451	9.1	100
6	200	1,340	6.7 (6.9)	83
7	250	1,321	5.3 (6.0)	88
8	84	668	8.0	100
9	255	1,271	5.0 (5.4)	82
10	153	332	2.2	52
Average	1,621	11,910	7.3 (7.4)	89

The daily usage turnover figures are based on the total number of tickets issued in January, 1981, and assuming that Saturday usage was 70% of the weekday average. Since the average lengths of time parked at each facility are similar, the turnover rates are a good proxy for overall occupancy. If the turnover rate exceeds 11, the lot is basically full all day. With a turnover of around 6, the lot operates at about 50% occupancy on the average. The results show that Facilities 1 through 4 operate at or near capacity all day, and lots 5 and 8 are very heavily used also. Facilities #6, 7, and 9, the largest facilities, have substantially lower usage per space, but about the same total usage as Lots 4 and 5. Lot #10, located in the lower State Street area, has a very low level of usage.

The peak occupancy data was taken between 1:30 and 2 PM on four consecutive weekdays in May, 1981. The overall occupancy was 89%, or much higher than the overall daily average of about 67%. Furthermore, six of the facilities were completely full and had queues of cars waiting to enter the facility. (These six facilities were the same six facilities having the highest turnover rates.) Three other facilities had peak occupancies between 82 and 88%, and the poorly utilized Lot #10 had peak occupancy of only 52%.

Curb Spaces

Occupancy

Determination of the overall usage of curb parking spaces is based largely on field counts done in the early afternoon by the Public Works Department in February, 1980. Additional counts on those streets in the study area without reliable data were made by both the Public Works Department and the consultant in May and June, 1981. Figure 28 and 29 show the results of these counts, shown in terms of the percentage of parking spaces occupied on each block. Figure 28 shows the results for those blocks with 15-minute or 90-minute parking restrictions; Figure 29 shows the results for the blocks with unrestricted parking.

For those blocks with time restrictions, there is great variation in usage. About 30% of the blocks had more than 85% of the spaces filled, the level that is generally taken to mean that demand exceeds capacity. On the other hand, 30% of the blocks also had under a 55% occupancy, suggesting that the parking supply on these blocks is quite underutilized. In general, the blocks with the greater demand were the 800 to 1200 blocks of Anacapa and Santa Barbara Streets and adjacent

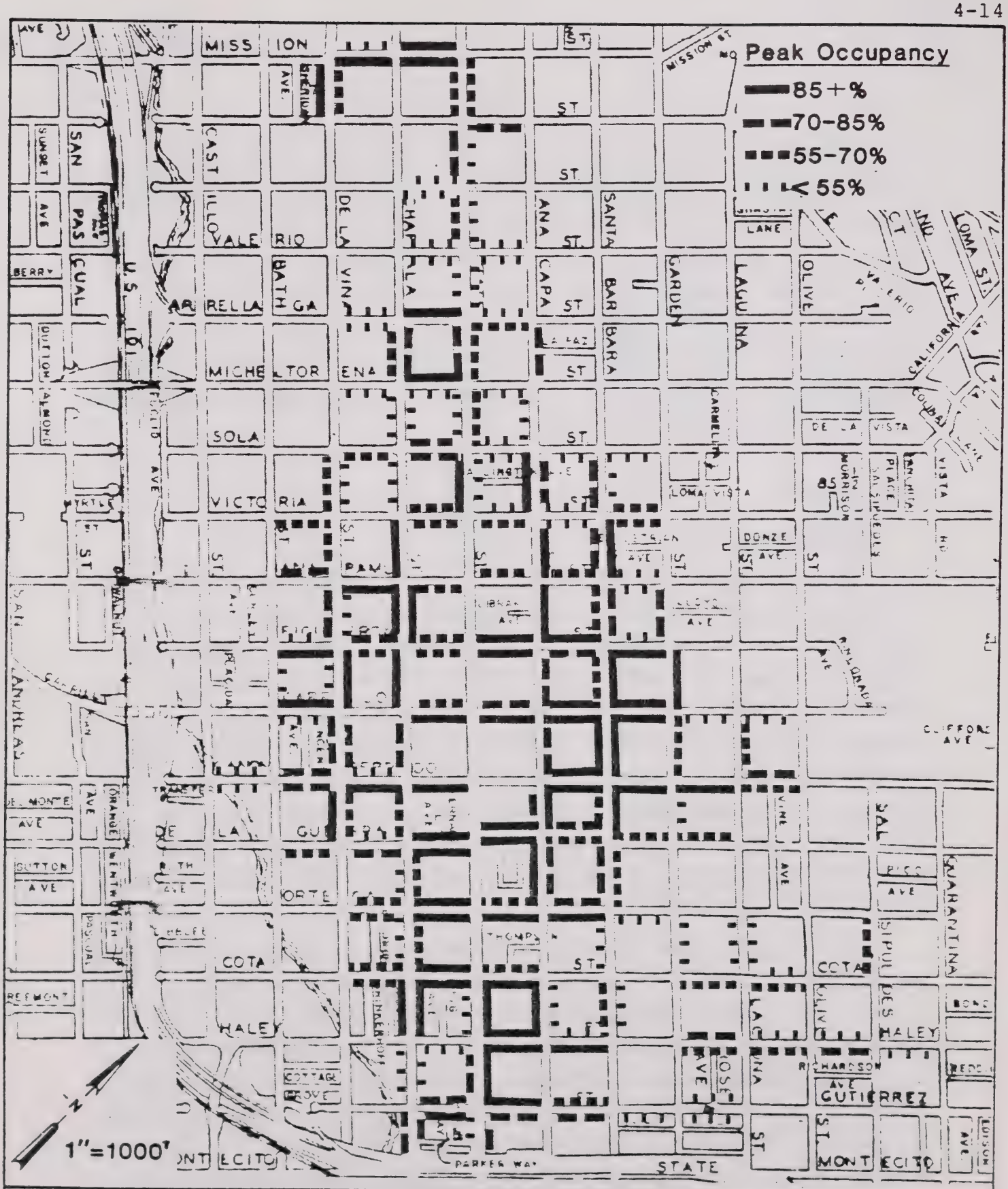
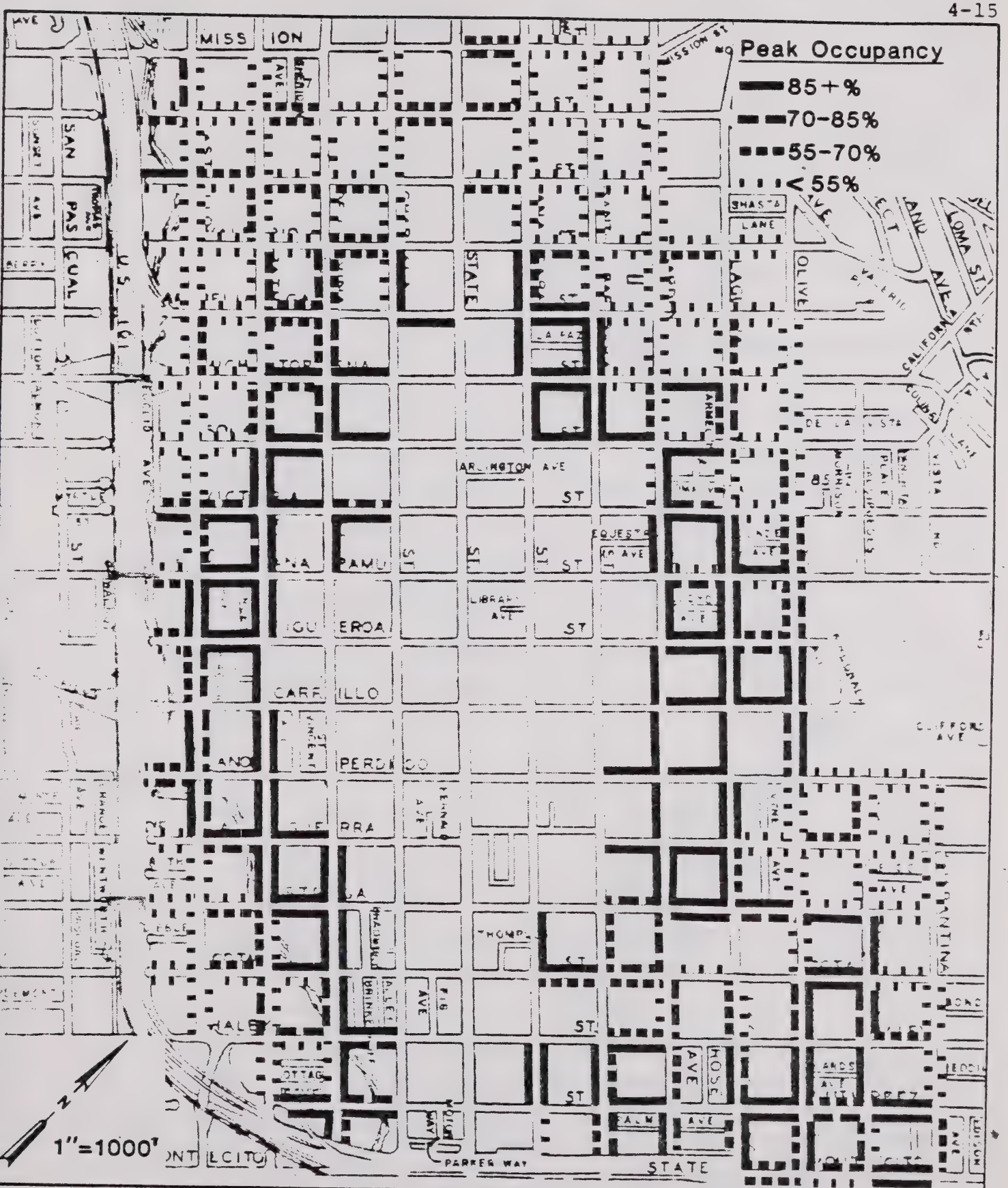


Figure 28

Curb Parking Occupancy
(15 and 90-Minute Parking)

jhk & associates



jhk & associates

Figure 29
Curb Parking Occupancy
(All-Day Parking)

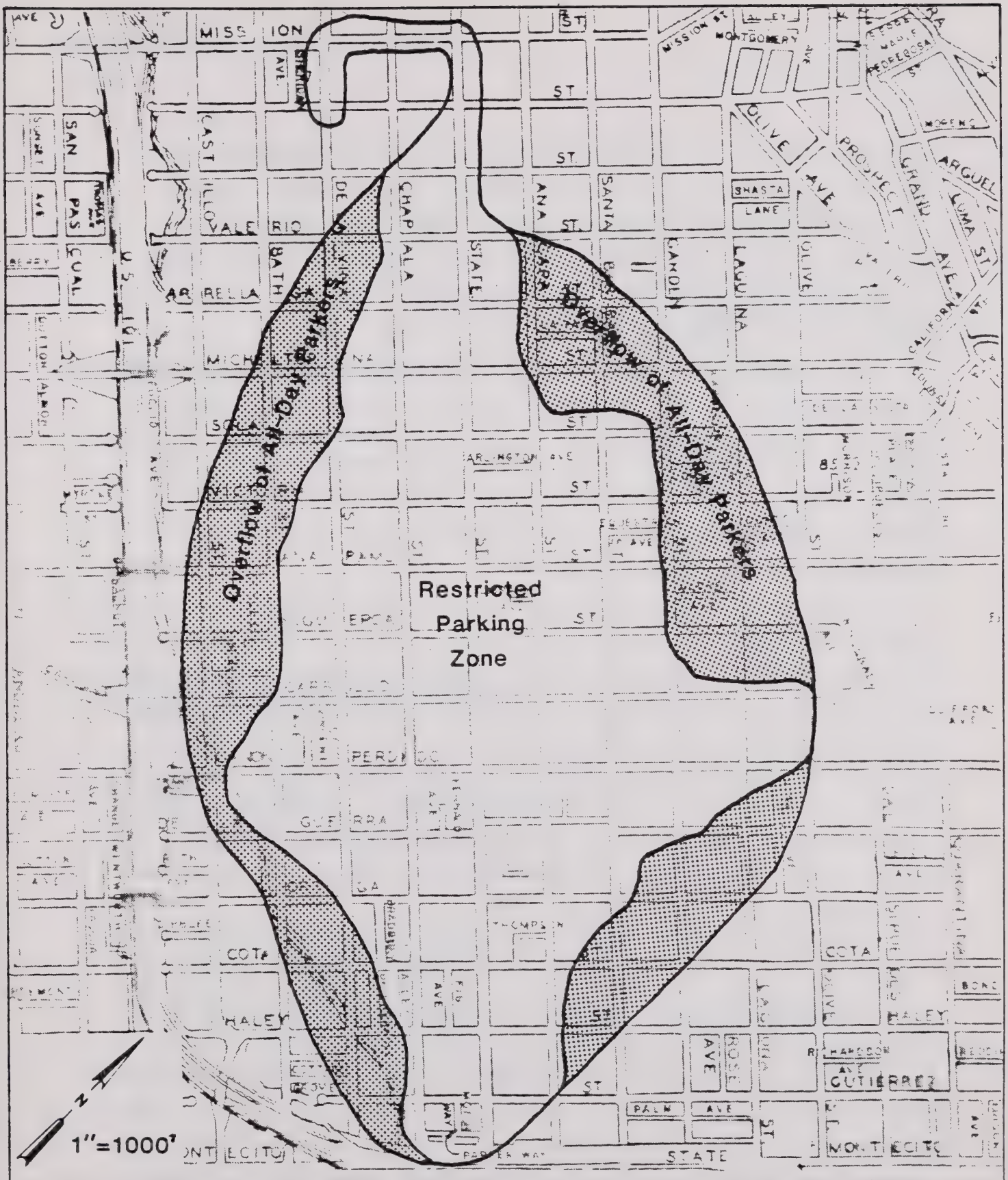
east-west streets, and the blocks just east and west of State Street from Figueroa Street south. Interviews with the City's parking enforcement officers confirmed that these were the blocks with the greatest demand. The blocks furthest from the center of the CBD generally had the least usage.

On the blocks without parking restrictions, a much clearer pattern of usage emerges. The blocks with heavy usage (more than 70% occupancy) form a well-defined ring around the restricted parking area that extends about two or three blocks outward. These are the blocks in which Downtown employees park, from which they then walk several blocks to their work places in the CBD. Beyond this ring, almost all blocks are more than half-empty and there is no parking encroachment from downtown employees. Figure 30 shows a simple schematic representation of this pattern. In addition, there are several additional blocks in the southeastern part of the study area with heavy parking usage due to local employee parking demand.

Turnover

Turnover on the 90-minute curb spaces is of special interest because these spaces are reserved for short-term parkers, and like the City's off-street parking facilities, should have most people parking for short time periods. While the Parking District's rate schedule serves as an effective deterrent to long-term parking in the off-street facilities, the threat of a citation deters long-term street parking in 90-minute spaces.

A 7-hour field study was undertaken on Monday, June 8, to determine parking turnover in the 90-minute and 15-minute curb spaces, and consequently, how effectively these spaces were being enforced. Ten of the busiest blocks were chosen for the study: The 900 to 1200 blocks on the east side of Anacapa Street and the west side of Santa Barbara Street,



jhk & associates

Figure 30
Approximate Parking Impact of Downtown Commercial Activity

the East 100 block of Canon Perdido Street (north side) and the East 100 block of Victoria Street (south side). These ten blocks have 96 90-minute spaces and 9 15-minute spaces. Each space was checked every half-hour and the license number of the parked car noted. The duration of each car's stay could then be estimated to the nearest half-hour.

The results of the study are shown in Table 12. The 17% violation rate in the 90-minute spaces is somewhat higher than in cities where parking is enforced vigorously. In those cities, violation rates of less than 10% are observed. In Santa Barbara, the violators accounted for about a third of the occupied space hours, thus using up much of the space dedicated to short-term parkers.

Many of the violators were undoubtedly shoppers and persons running errands who required a little more time than the 90 minutes allowed. However, Santa Barbara's parking enforcement officers insist that much of the 90-minutes parking is taken up by downtown workers who avoid citations by moving their cars two or three times a day, and this was readily observed while the field study was being conducted. Several license plate numbers reappeared in a different space on the same block while others were observed to have been moved across the street. At 10:30 AM, the surveyor observed three persons on two blocks getting into their cars on Anacapa Street and driving into the City parking lots across the street.

Downtown workers are able to play this game because a car is usually not ticketed until substantially more than 90 minutes has elapsed. On the day of the field survey, only two of the 87 cars observed parking over 90 minutes were actually ticketed, and they were parked for 5½ and 7 hours respectively. Workers apparently feel that moving their cars two or three times a day is better than paying $30 for a monthly parking space in a private lot or walking a few blocks to and from their cars.

TABLE 12

RESULTS OF CURB SPACE PARKING DURATION STUDY

	90-min. spaces (n=506)	15-min. spaces (n=50)
Percent of cars parked for:		
1/2-hour	40%	76%
1 hour	24%	14%
1 1/2 hours	18%	6%
2 hours	10%	0%
2 1/2 hours	3%	4%
3 hours	2%	-
Over 3 hours	2%	-
Percent of cars violating time limit (includes an approximate 15-minute grace)	17%	24%
Percent of occupied space-hours occupied by violators (percentage in parentheses excludes first 90 or 15 minutes that the violators were parked legally)	37%(15%)	46%(35%)
Percent of total space-hours available that were occupied by violators (percentage in parentheses excludes first 90 or 15 minutes that the violators were parked legally)	32%(13%)	26%(20%)

In order to precisely estimate the magnitude of this phenomenon, it would be necessary to do a license plate survey for the entire CBD, including the District's parking lots, and analyze the results by computer. This would go beyond the scope of the present study. However, based on the 10-block survey conducted, an estimated 15 to 20% of the 90-minute curb spaces in the CBD and 5 to 10% of the Parking District spaces are taken up by downtown workers shuttling their cars. This corresponds to between 225 and 350 persons who basically park all or most of the day in short-term spaces and move their cars. This is less than 4% of all of those who drive to work.

CURRENT PARKING NEEDS

In order to assess the magnitude and scope of the downtown parking shortage, three methods were used. The first technique relied upon the field occupancy data reported earlier. The second technique was based on a comparison of downtown floor space area and parking supply, and the third method used the results of a survey of downtown businesses undertaken in April, 1981.

Assessment of Need Based on Field Data

The traditional method of calculating parking needs is to compare the number of cars parked on a block or in a parking lot with the capacity of that block, or lot, usually assumed to be 85% of the total number of spaces. The additional parking required is the sum of the additional parking spaces required so that each block face and parking lot is no more than 85% occupied during the time of peak demand (around 2 PM).

In calculating the parking shortfall in Downtown Santa Barbara, some small modifications were made to this basic methodology. First, a 90% capacity figure was used for the

City parking facilities rather than 85%. If on-street parking spaces on a given block have an 85% occupancy, a driver may only find one or two spaces to park on the block. However, in a large parking lot, an 85% occupancy means that there are several available spaces in a small area and it won't matter much to the driver if the first 10 or 15 spaces are full providing that there are some available spaces. On the street, however, if a driver confronts 10 or 15 full parking spaces on the street where he wants to park, it may mean parking around the corner somewhere, or on another block. Thus, it seems warranted to use a higher capacity figure for parking lots, and a 90% figure was used.

The other major difference in approach was that a 70% capacity figure was used for on-street spaces on blocks without parking restrictions, except in the southeastern area which is primarily industrial. These blocks are primarily in residential areas and perceived parking occupancy standards are higher. That is, residents generally expect to have more available parking spaces in front of their homes than commercial enterprises do.

Finally, six of the public off-street parking lots had a 100% occupancy during the peak period. For these lots, an additional 5 cars per lot were added to the calculated shortage, reflecting cars in the queue to enter the lot.

Using the field occupancy data reported in previous sections and incorporating the modification discussed above, a total parking shortfall of 678 spaces was calculated:

Type of Space	Shortage (spaces)
Short-term curb spaces	92
Off-Street public parking (short-term)	108
Long-term curb spaces (except SE)	435
Long-term curb spaces (SE area)	43
	678

Except for the 43 spaces in the southeast, almost all of the calculated shortage results from excess parking demand in the CBD core area (although most of the all-day curb parking is located outside of the core area, most of the employees who use these spaces work in the core area). The shortage represents about 8% of the available parking supply in the core area.

The data also shows that most of the current need is for all-day employee parking rather than short-term shopper and visitor parking. Even if an 85% capacity figure had been used for the residential blocks, the shortage on these blocks would still comprise about half the total shortage, although the total shortage would drop to 468 spaces.

Assessment of Need Based on Commercial Floor Space

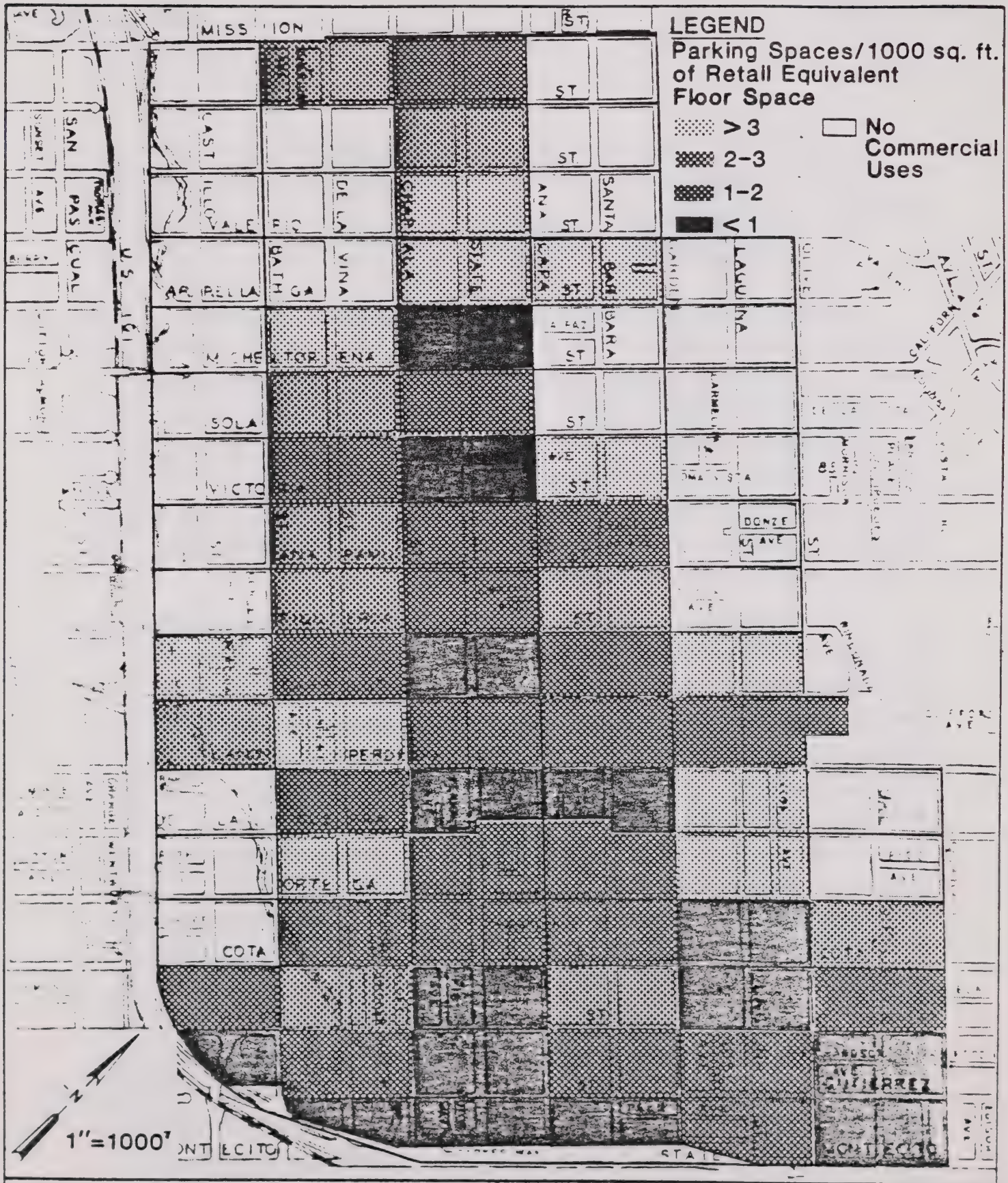
This method of analysis compares the amount of commercial floor space to the amount of available parking in order to estimate parking needs. To do this, the downtown study area was divided into 93 2-block zones. In each zone, the amount of existing commercial floor space was calculated based on the data assembled by the Department of Community Development. Floor space was divided into retail, office, hotel/motel, institutional, and industrial categories. Since these latter uses generally require less parking than if the same space was used for retail activity, non-retail floor space was multiplied by factors to account for this. For each zone, then, a total amount of "retail-equivalent" floor space was obtained. The multiplier factors were based on general guidelines which have been avanced for determining parking space requirements in City zoning codes, but do not precisely reflect Santa Barbara's zoning code. The factors are:

Use	Factor
Office	0.8
Hotel/Motel	0.6
Institutional Buildings	0.8
Industrial	0.4

In each zone, the total amount of parking, including on-street and public and private off-street parking was determined. The ratio of parking to retail equivalent floor space was then calculated for each zone. The results are shown in Figure 31. Overall, those zones with commercial development had an average of 1.36 spaces per 1000 square feet of retail equivalent floor space. However, there was no clear geographic pattern regarding which area of downtown had the greatest need or which area had excess parking.

The City's zoning code normally requires four parking spaces for every 1000 square foot of retail floor space. However, the concentration of activity in the CBD tends to reduce the required parking for several reasons. First, many customers are also downtown employees who walk to the stores rather than drive and park. Thus, the retail stores do not need as much parking since their customer's parking needs are already taken care of at the work place. Second, more downtown employees and customers use transit than in other locations, and parking needs are further reduced. For these reasons, commercial uses in the Downtown C-2 zoned area are required to only provide two parking spaces per 1000 sq. ft. of space.

Unfortunately, there are no precise guidelines for determining the amount of parking that should be provided in the CBD relative to floor space. Studies of peak parking demand as a function of floor space have produced different results, and no one has yet quantified the factors which cause this variation.



jhk & associates

Figure 31
Parking Supply Compared to Commercial Floor Space

The most comprehensive survey of these studies was compiled in 1971 by the Highway Research Board,[1] and the results are shown below:

Type of CBD Land Use	Number of Studies	Peak Parking Demand/1000 Sq. Ft. Floor Space	
		Average	Range
Small Retail Stores	10	2.1	0.9 - 3.8
Department Stores	12	2.0	Not reported
Office Bldgs.	20	2.0	0.7 - 4.6
Banks	11	3.3	Not reported
Restaurants	7	2.8	Not reported
Hotels	8	0.7	0.4 - 1.0
Medical Bldg.	8	5.0	1.1 - 8.6
Industrial	61	0.65/employee	0.60 - 0.76/employee

The above data suggest that a figure of 2.0 required parking spaces per 1000 square feet of retail floor space is a reasonable figure to apply in Santa Barbara. However, in order to have two spaces for every 1000 square feet of "retail equivalent" floor space, about 2500 additional spaces would have to be provided in the downtown study area. This is also several times more than that calculated using the field occupancy data. It is possible that the estimates of floor space are slightly high because they are based on parcel land area rather than actual building area dimensions, but this would not change the basic conclusion of a severe parking shortfall.

---

[1] Highway Research Board, Parking Principles; Special Report 125, Washington, D.C. 1971)

Part of this excess demand parks on residential streets adjacent to those blocks with commercial development shown in Figure 31. However, this can account for only a small part of the excess demand, and there would still be a great discrepancy between the calculated shortfall based on floor space data and the shortfall estimate based on the field occupancy data. This suggests that there is a great unfulfilled latent demand for parking, and that if additional parking were provided, more cars would be coming into Downtown and parking.

Perceptions of the Problem

An important element of a parking analysis is the local perception of the problem. Therefore, the third method of assessing parking needs is based upon a survey of downtown businesses conducted in April, 1981. A short questionnaire, shown in Figure 32, was used to solicit the opinions of downtown business owners and managers regarding the downtown parking situation. The survey was sent to about two-thirds of the businesses in the Downtown Parking District located within approximately one block of State Street (within zones of benefit of 20% or greater; see Chapter 5 for the definition of zones of benefit). In addition, almost all businesses on State Street north and south of the Parking District were sent questionnaires. This sampling procedure allowed us to contrast the views of those businesses in the central core of the CBD with those businesses located north and south of the central core. Altogether, a 50% response rate was obtained:

Area	Mailed	Returned	% Response
Parking District Core	274	140	51
State St., North & South of Core	123	56	46
Unknown	--	2	--
TOTAL	397	198	50

JHK & Associates, a transportation consulting firm, is conducting a study of downtown parking needs for the City of Santa Barbara. To help us accurately assess these needs, we would appreciate your taking a few minutes to answer the following questions about how existing parking conditions affect your firm. Please return the form in the envelope provided. Thank you very much.

1. Name of Firm: _____

2. Address: _____

3. Name of Person Completing This Form: _____

   Title: _____

4. Type of Firm :

   _____ Retail Store _____ Restaurant _____ Other (specify)
   _____ Office _____ Bank _____

5. Number of Employees: _____ Full-time _____ Part-time

6. Main Working Hours: _____ to _____

   Other Major Work Shifts: _____

7. How would you rate the availability of parking for:

	Plentiful	Adequate	Somewhat Inadequate	Very Inadequate
a. Employees	____	____	____	____
b. Customers/ Visitors	____	____	____	____

8. On the average, how far from your entrance do employees and customers/visitors have to park?

	Same Block	1 Block	2 Blocks	3 to 4 Blocks	5 or more Blocks
a. Employees	___	___	___	___	___
b. Customers/ Visitors	___	___	___	___	___

9. What changes or improvements in downtown parking should be made?

_____

_____

_____

jhk & associates

Figure 32
Downtown Business Survey

The survey results (Table 13) indicate clearly that downtown businessmen perceive a severe shortage of employee (long-term) parking, while the availability of customer/short-term parking is seen as much less of a problem. Sixty-one percent of the respondents felt that employee parking is very inadequate, compared to 22% feeling the same way about customer parking. Most of the persons completing the forms were managers of retail stores and services, who are normally quite concerned about customer parking. Therefore, the strong concern expressed about employee parking is extremely significant, and suggests that employee parking is indeed the more seriously perceived problem.

The survey also found that employees walked an average of 2.5 blocks (¼ mile) from their cars to work, and customers/visitors walked an average of 0.8 blocks. Compared to 33 other urban areas with populations between 100,000 and 250,000, these walking distances are about 10% less than average for shopping trips, but more than twice as far for work trips.[1] In figures 33 and 34, the relationship between perceptions and how far away people have to park is displayed rather clearly in two different ways. These results show that as people are forced to walk two or more blocks from their cars to their destinations, most people become very dissatisifed with the parking situation. The results emphasize the need to provide parking as close as possible to where people are going. They suggest that providing additional parking on the edge of the CBD might not help alleviate the problem very much.

---

[1] Highway Research Board, Parking Principles; Special Report 125, (Washington D.C., 1971)

TABLE 13

RESULTS OF THE DOWNTOWN BUSINESS SURVEY

TOTAL MAILED: 397

TOTAL RETURNED: 198 (50%)

Perceptions of Parking Availability for:

	Employees (n=190)	Customers (n=195)
Plentiful	7%	10%
Adequate	17%	37%
Somewhat Inadequate	15%	31%
Very Inadequate	61%	22%

Average Distance (Blocks) Parked from Entrance by:

	Employees (n=193)	Customers (n=190)
Same block	25%	52%
1 block	8%	28%
2 blocks	11%	14%
3 to 4 blocks	37%	4%
5 or more blocks	18%	2%
Mean	2.52	0.79

Average Distance Parked from Entrance vs. Perceptions

Perceptions of Parking Availability	Average Distance Parked, in blocks (sample in parentheses) Employees	Customers
Plentiful	0.00(14)	0.11(19)
Adequate	0.35(33)	0.42(70)
Somewhat Inadequate	2.48(27)	0.86(59)
Very Inadequate	3.52(114)	1.65(41)

TABLE 13 (Cont.)

Percent Perceiving Parking as Very Inadequate vs. Distance Parked

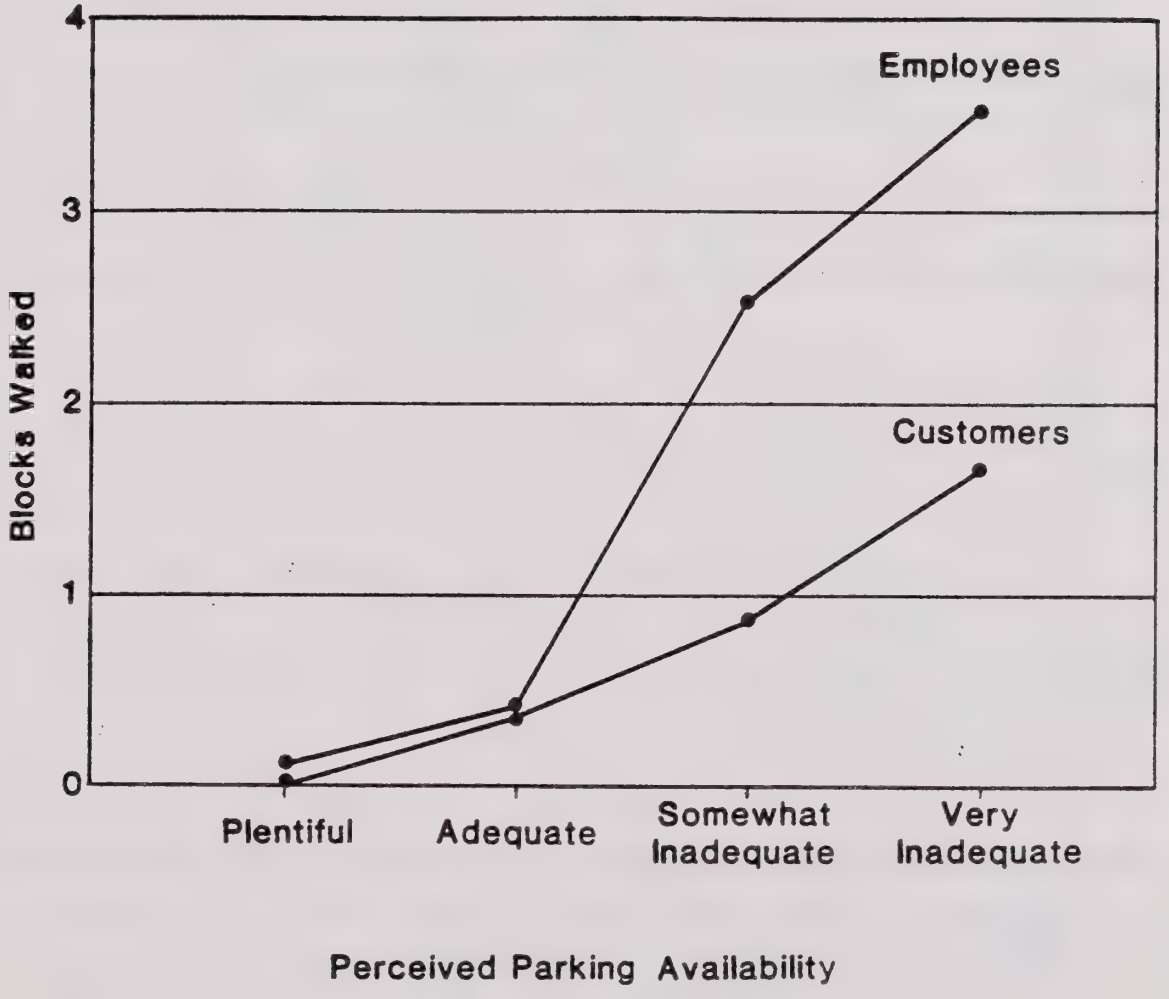
Distance Parked	Percent Perceiving Parking As Very Inadequate (sample in parentheses) Employees	Customers
Same block	17%(46)	10%(98)
1 block	33%(15)	21%(53)
2 blocks	85%(20)	44%(27)
3 to 4 blocks	76%(72)	73%(11)
5 or more blocks	97%(35)	

Perceptions and Distance Parked vs. Location

Location	n	Percent Perceiving Parking as Very Inadequate Employees	Customers	Average Distance Parked from Entrance Employees	Customers
State St. Mall (800-1200 blocks)	84	70%	15%	3.10	0.68
Within 1 block E&W of Mall	54	62%	20%	2.52	0.74
Lower State (400-700 blocks)	33	56%	38%	1.95	1.13
Upper State (1300-1900 blocks)	23	27%	30%	1.14	0.86

Perceptions and Distance Parked for Employee Parking vs. Work Starting Time

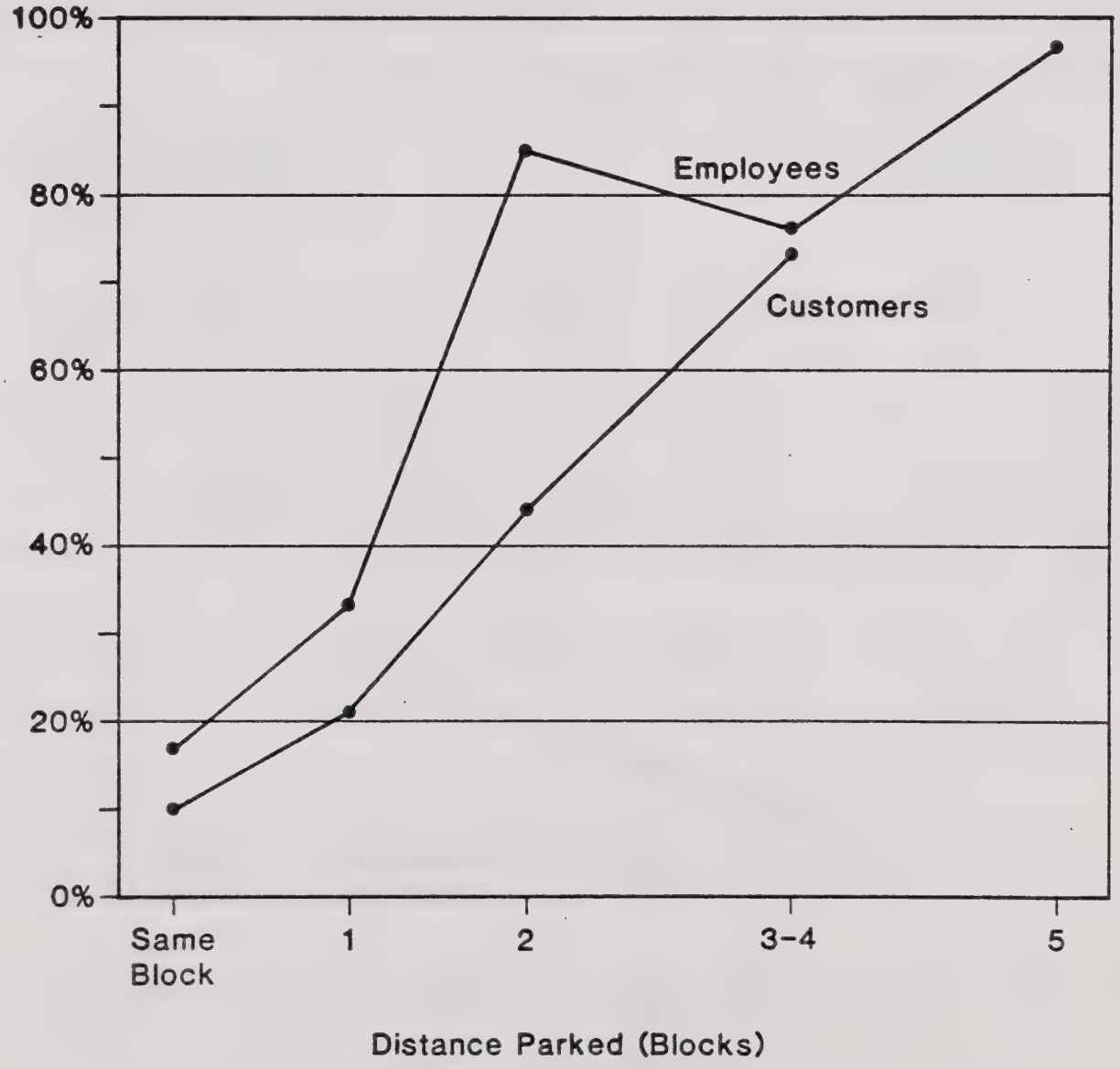
Time Work Shift Begins	n	Percent Perceiving Employee Parking as very Inadequate	Average Distance Employees Park from Entrance
Before 8:30 AM	59	47%	2.16
8:30 AM-9:29 PM	77	61%	2.41
9:30 PM and later	57	74%	3.04



jhk & associates

Figure 33

Average Distance Parked Versus Perceived Parking Availability



jhk & associates

Figure 34

Percent Perceiving Parking to be Very Inadequate as a Function of Distance Parked

The other very significant results from the survey refer to the variations by area. As would be expected, those businesses on the State Street Mall had the worst view of the employee parking situation; 70% perceived employee parking availability as very inadequate, and employees parked an average of 3.1 blocks from their destinations. Those businesses near the Mall and on the Lower State Street blocks perceived the situation a little better, but the majority still felt that employee parking availability was very inadequate. By contrast, relatively few of the businesses north of Victoria Street perceived a great employee parking problem, and employees there parked only 1.1 blocks away on the average.

The customer parking situation is dramatically reversed. Those businesses on the State Street Mall, having City-owned parking facilities located directly behind them, perceived customer parking to be quite adequate. Only 15% termed the situation very inadequate, and customers were reported to walk less than 0.7 blocks on average. On the other hand, over 30% of the businesses north and south of the Mall perceived customer parking availability as very inadequate, and walking distances were substantially longer than for the businesses along and near the Mall. In the upper State Street blocks, customer and employee parking are perceived to be roughly equal problems. In the Lower State Street blocks, however, employee parking is still perceived to be the greater problem. The establishment of Parking Facility #10 may have helped to improve the perception of customer parking in that area.

A final set of tabulations in Table 13 shows how those employees who start work earliest have a somewhat better perception of the employee parking situation since they fill the unrestricted parking spaces that are closest to the CBD. Among those firms with work starting times before 8:30 AM, only 47% perceived parking availability as very inadequate,

and walks averaged 2.2 blocks. Among those firms who start work after 9:30 AM, and whose employees are forced to park further away, 74% perceived a very inadequate situation.

The business survey also solicited comments, which have been tabulated and summarized in Table 14. As can be seen, the most frequently made comments referred to the need for more employee long-term parking. Relatively few people referred to the need for more short-term parking.

Summary

The analyses described in the previous sections all indicate that there is a major shortage of parking in the CBD, particularly for those who work downtown. The field data show that there is an immediate need for almost 700 additional parking spaces, and the analysis based on floor space suggests that the latent demand for parking far exceeds this. These estimates are based on normal weekday conditions; during the Christmas shopping season, parking demand is much greater, and the current shortage, based on field data, would probably exceed 1500 spaces. However, few cities strive to accommodate the Christmas demand since the required parking spaces would be empty for eleven months of the year. Instead, the parking spillover into adjacent neighborhoods enlargens, and people end up walking further than normal.

There is no single area that suffers disproportionately from the parking shortage; rather the parking shortage seems to be spread over the entire downtown commercial area. The Lower State Street area (300 to 500 blocks) seems to be somewhat worse than average, considering its noncentral location. This area had the lowest parking to floor space ratio and its business managers generally had a worse perception of parking availability than business managers in other parts of downtown.

TABLE 14

SUMMARY OF PARKING SURVEY COMMENTS

More parking (general) 48

Make monthly parking permits available to employees at a reasonable rate 34

More employee long-term parking 28

More multi-level parking facilities 16

Extend or eliminate 90 minute restriction on free parking time 12

Provide small business parking space or loading zone limited to small business usage only 9

Fringe parking lots with shuttle service for employees 8

Eliminate parking fee after 6 PM 6

Provide more street parking 6

Build more city lots 5

More available employee parking in city lots 5

Employee concern (especially female employees) over long walk to car after daylight hours 4

Parking is adequate 3

Remove bike lanes from State St. 3

More short-term parking in city lots 2

Re-stripe existing lots to get additional spaces 2

Better enforcement of parking violations 2

Parking violation fines ($10-20) are too high 2

Eliminate monthly parking in city lots 2

Open more exits in city lots until a least 6 PM and during other peak use times 1

Encourage future developments to provide adequate facilities 1

TABLE 14 (Continued)

Allow parking after 5 PM on those streets with bike lanes 1

Install bicycle lockers on ground floors of parking garages 1

Make bike lanes safer through stricter enforcement of motor vehicle violations with regard to bike lanes 1

Eliminate all parking fees to customers 1

Automated vendors to decrease city parking lot costs 1

Provide bulletin-board type business directories in city lots 1

Do not allow parking lots to flash "full" signs unless they are actually filled up 1

Replace free parking with meters 1

Provide more county employee off-street parking 1

Encourage vanpooling 1

Reduce bus fares during commute hours 1

Improve and provide more subsidy for bus services 1

Eliminate red curbs and no parking signs where possible 1

Let businesses validate parking instead of city 1

Provide free parking to all city residents but introduce parking tax 1

Do not allow any trailer trucks, tour buses, or mobile homes to park on State St. 1

Cleaner parking lots 1

FUTURE PARKING CONDITIONS

Projected growth in Downtown commercial activity is not expected to significantly change the Downtown parking situation for two reasons. First, much of the growth will occur outside of the Parking District where any additional development must provide sufficient parking in conformance with the City's zoning code. Second, future developments in the Parking District are likely to provide their own parking because of the commercial advantage offered by dedicated parking. Also, the assessment credits achieved from providing parking justify the additional expenditure.

By 1995, an estimated 1.6 million square feet of "retail-equivalent" floor space, excluding the department stores and hotel/conference center, is expected to be added Downtown. However, over the last six years, 72% of the commercial floor space added in the Downtown study area has been located outside of the Downtown Parking District. If this trend continues, only about 450,000 square feet of "retail-equivalent" floor space would be added in the Parking Districts, and about half of this would be in the 100% zone of benefit. If all of this future development opted not to provide any parking beyond the minimum required in zones of benefit under 100%, about 550 additional parking spaces would be needed to maintain a ratio of two additional parking spaces/1000 sq. ft. of "retail equivalent" floor space. However, it is highly likely that much of the new development would provide its own parking, not only because of the benefit and convenience of having dedicated parking, but because the assessment credits received greatly lower the real cost of providing parking. For example, consider a property with X square feet of land area and Y square feet of floor space. Assume the land is valued at $40/sq. ft., the floor space is valued at $80/sq. ft., and gross retail sales are $150/sq. ft. with the average sale between $20 and $100. The annual assessments levied on this property for the Parking District would be as follows (See Chapter 5 for further discussion of Parking District assessments):

Ad valorem assessment (land): 1.55 (40X/100) = 0.62X
Ad valorem assessment (improvements): 1.55 (80Y/100) = 1.24Y
Parking & Business Improvement Assessment: 0.34 (150Y/100) = 0.51Y

Now, for every parking space provided (assuming a parking space requires 350 square feet of land), the following credits are generated:

Land Credit: 0.62X (350/X) (.75) = $163
Improvement credit: 1.24Y (350/Y) (.75) = $326
Business & Improvements credit: 0.51Y (350/Y) (.75) = $134

TOTAL CREDIT: $623

Thus, the property would receive a $623 annual credit for the parking space, which would largely cover the cost of providing the parking space, especially after various Federal and State tax credits associated with capital improvements are considered. For this reason, as well as the obvious commercial advantage that a property has when it has its own parking, most new developments built in the Parking Districts during the past decade have provided their own parking. This trend is expected to continue, so future Downtown development is not expected to significantly worsen Downtown parking conditions.

5. PARKING IMPROVEMENT STRATEGIES

The previous chapter concluded that there was a significant shortage of parking in Downtown Santa Barbara. This chapter discusses various improvement strategies to alleviate this shortage. First, parking management techniques are reviewed. These techniques improve the efficiency of the existing parking supply, as opposed to constructing new facilities. All of the measures described can be implemented rapidly and inexpensively. More costly parking facility expansions are then discussed, followed by an analysis of the Parking District's ability to finance these expansions.

PARKING MANAGEMENT TECHNIQUES

Eliminate Parking Restrictions in Areas with Low Demand

The 90-minute curb restrictions are generally desirable in that they keep the inner spaces available for shoppers and visitors rather than being usurped by all-day parkers. However, this policy is only effective on a particular block if there is sufficient demand for short-term parking to justify the restriction. Many blocks in Downtown Santa Barbara do not have this demand, and consequently, there is little parking usage on these blocks. Given the great need for additional all-day parking in the Downtown area, it is appropriate to remove these restrictions and allow employees to use these spaces.

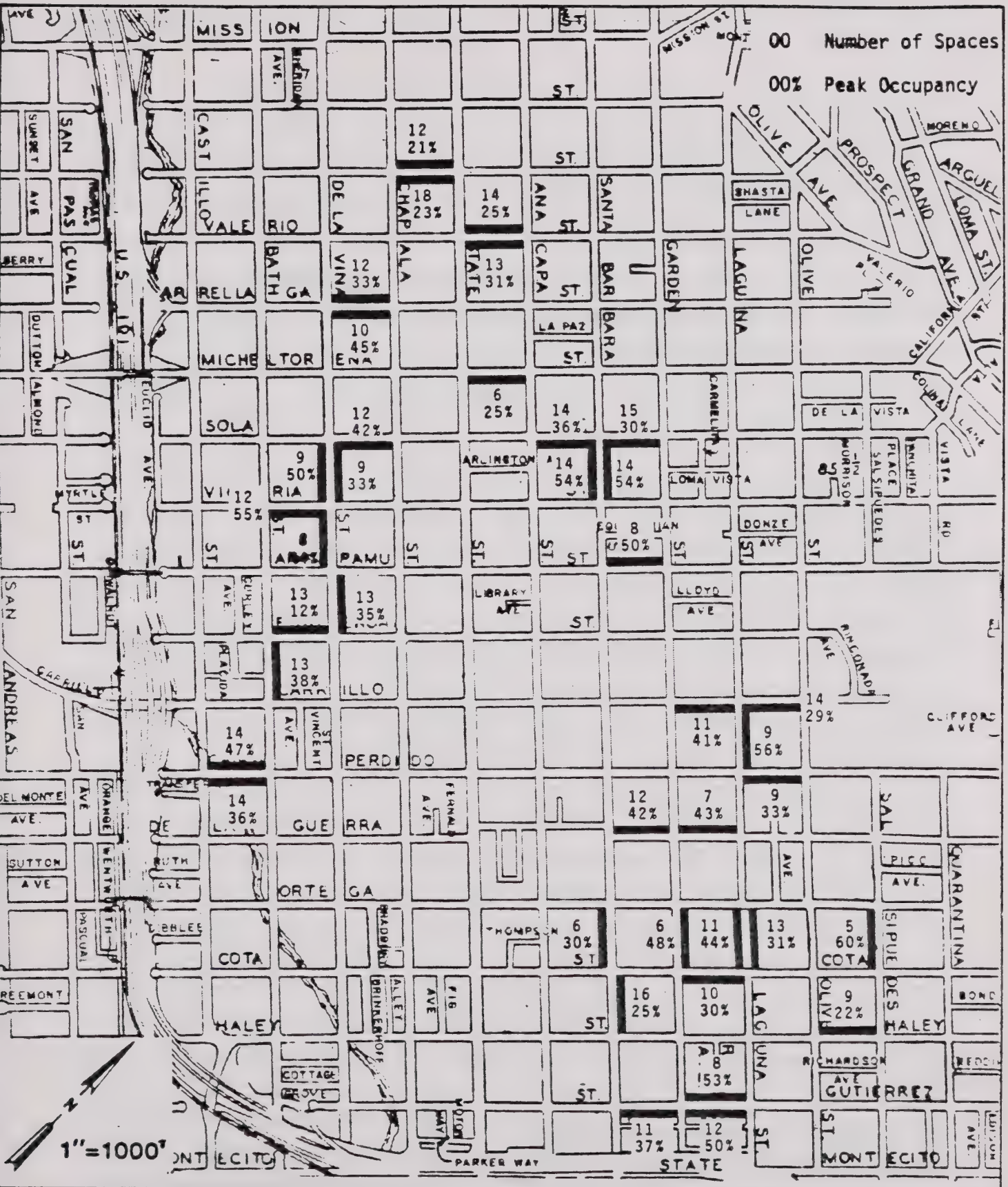
Blocks where the 90-minute restrictions might be lifted were identified by first reviewing the parking occupancy data and locating blocks where occupancies were low (below 55%). The consultant then discussed this issue with the City's four parking enforcement officers to solicit their views on which blocks had little usage and did not need the 90-minute restrictions. A second set of peak occupancy count were then taken for all of these blocks and the blocks were checked to see if there was significant commercial development without its own off-street parking. In the end, blocks where peak occupancy was below 60% and which didn't have substantial commercial use were selected for possible elimination of the 90-minute restrictions.

These blocks, along with the number of spaces and the average peak occupancy recorded, are shown in Figure 35. Altogether, 436 spaces are included, or about 22% of the total 90-minute curb parking supply. On average, these spaces had a peak occupancy of only 37%, and almost all of the blocks are located outside of the CBD core. By removing the 90 minute restrictions from these blocks, they will provide additional parking spaces for Downtown employees, shortening their walks to work and reducing the extent of encroachment into residential areas. On some blocks, it may be desirable to provide two or three 15-minute spaces that could be used by short-term parkers.

A related plan was recently introduced in Parking Facility #10, the newest facility located at Ortega and Anacapa Street. This lot, previously used for short-term parking only, is extremely underutilized because it is located south of the major concentration of retail activity. The Community Development Department has begun renting 50 spaces for $30 (regular) and $10 (carpools) per month, thus making more efficeint use of this lot. The proposal to eliminate 90-minute restrictions on selected blocks would basically serve the same function for the underutilized short-term curb spaces.

Increased Enforcement

As discussed in the previous chapter, the violation rate on 90-minute curb spaces is fairly high, and there is considerable usage of these spaces by all-day parkers who move their cars from space to space to avoid being cited. The field study showed that there is little chance of being cited for a small overtime violation, and about 17% of the cars parked exceed the 90 minute limit, compared to only 10% in the public off-street facilities.



jhk & associates

Figure 35
Candidate Blocks for Removal of Parking Restrictions

If any of the 90-minute restrictions are lifted, as discussed in the previous section, the need for effective enforcement will be further heightened since there will be fewer spaces to accommodate the short-term demand. Even without such changes, however, an additional enforcement officer to patrol the Downtown area is warranted in order to reduce violations and discourage employee parking in 90-minute spaces. Parking fines currently generate about three times as much revenue as the current enforcement costs, and an additional officer would probably pay his way in additional fine revenues.

An alternative method to reduce violations and improper use of short-term curb spaces would be to install meters. A 20¢/hour charge would eliminate almost all of the all-day parkers since it would now cost them about $1.60 a day ($32/month) to park, or about the same as for private off-street parking. Even a 10¢/hour charge, combined with sporadic tire chalking to discourage meter feeding, would discourage most employees from parking. The other advantage of meters over posted time limit is that meters are much easier to enforce since timed tire chalking is eliminated.

Meters have traditionally been opposed in Santa Barbara because of their inconvenience to motorists and their unaesthetic characteristics. An alternative system, is to sell parking tickets or coupons at stores and kiosks which a person attaches to his windshield when parking in a restricted space. The person first punches out the date and time that he is parked, and discards the ticket after use. Although this system has yet to be tested in the United States, it is successfully used in every major city in Israel. Its major advantages are that it is much cheaper to operate than a meter system, and there is greater flexibility with regard to changing rates, and expanding or contracting restricted parking areas. The disadvantage is that it is likely to be perceived as confusing and inconvenient at first. Since it is an innovative concept, it is likely that installation of such a system could

qualify as an FHWA or UMTA demonstration project (the latter if transit service is expanded at the same time), enabling installation, promotion and evaluation costs to be largely paid by the Federal Government.

Restriping Existing Parking Facilities

The Public Works Department currently has plans to restripe off-street parking facilities to increase the number of spaces, principally by converting most rows of 9'-width stalls to 8½' stalls. This is projected to result in an increase of about 110 parking spaces. Some additional improvement could be derived if areas of each lot are set aside for compact cars. Such spaces are normally 7½' to 8' wide and two to three feet shorter than conventional spaces. Aisle widths can also be reduced. Nationally, about 45% of all cars in use in 1980 were small cars (subcompacts and compacts), and this is projected to grow to 75% in 1985.[1] In California, these percentages are typically higher.

The Public Works Department opposes restriping the City's off-street facilities for small cars, and has instead opted for making all spaces slightly smaller. A careful study of the potential increase in spaces in each facility was therefore not attempted. However, a typical plan would designate between 30 and 40% of the spaces as small-car spaces, and a net increase in spaces of 3 to 5% is likely (above the current restriping plan). Thus, it is likely that an additional 50 to 85 spaces could be created by designating small car stalls.

---

[1] Roti, Richard F. "Small Cars in the Automobile Population," Parking (July 1980), pp. 58-63.

Install Diagonal Parking

Diagonal parking on streets increases the number of parking spaces available at a minimal cost, but is generally opposed for two reasons. First, it reduces street capacity due to the greater space required and the delay caused when vehicles back out for parking. Second, accidents usually increase relative to streets with parallel parking. Given these drawbacks, diagonal parking should only be considered on streets that have low traffic volumes, excess traffic capacity, low travel speeds, and little through traffic.

Unfortunately, almost all of the streets in Downtown Santa Barbara are 36 to 42 feet wide, which allows for only two lanes of traffic plus parallel parking on both sides. Installing diagonal parking on one side would require either the elimination of parking on the other side (thereby effectively negating the benefit of diagonal parking), or removing a traffic lane. Since there is only one traffic lane in each direction, this is not possible unless the street were made one-way.

There are four east-west streets within the CBD core with very low traffic volumes (less than 3000 vehicles per day). They are Sola, Figueroa, De La Guerra, and Ortega streets. If they were made one-way with diagonal parking on one side replacing an existing traffic lane, the streets would still have adequate traffic capacity and about eight additional spaces would be gained per block (up to 132 for all four streets in the critical area betwwen Santa Barbara and De La Vina streets). While this strategy is feasible, projected growth in Downtown traffic may eventually result in traffic capacity problems. Furthermore, the nearly doubling of traffic per lane on these streets as a result of lane removal would cause traffic levels to be fairly high in terms of what is desirable for diagonal parking. Therefore, this proposal while being a very inexpensive way to increase parking capacity, is not recommended.

PARKING FACILITY EXPANSION

Current parking expansion plans and parking management strategies can meet part of the need for additional parking. In particular, current restriping plans and programmed public lot expansions will result in approximately 200 additional parking spaces in the City's parking facilities. Allowing employee parking in Lot #10 and on selected streets that currently have 90-minute time restriction will also improve the overall parking situation. Finally, two new lots in the lower State Street area may soon be built, adding 310 spaces. Still, the need for additional parking will likely remain even after these tactics are implemented. Furthermore, there is the possibility that a residential parking permit program will be implemented in the residential areas surrounding Downtown, which will displace over a thousand employee parkers and greatly increase the need for additional parking. In discussing expansion requirements, the need for additional short-term parking is first addressed, followed by a discussion of parking expansion to satisfy employee parking demand.

Short-Term Parking Expansion

The major need for short-term parking is within the Parking District, where the greatest concentration of commercial activity is located. Several of the Parking District lots are constantly filled, especially the five facilities between Chapala and State Street which operate near capacity over the entire day. These surface lots are much more heavily used than those on the east side of State Street, which include two multi-story facilities. Therefore, any future expansion should first be on the west side of State Street.

Decking one or more of the existing lost is the most sensible alternative since additional land would not have to be acquired.

In any case, the high price of land in Santa Barbara makes multi-story parking facilities more cost-effective per space than surface lots (the breakeven point is around $20/square foot, and land prices in the core area are about double that). It is also advisable to add only one level to two or more lots rather than building a three- or four-level facility. Aside from being aesthetically more compatible with Santa Barbara's low building heights, it is better to spread the benefit of added parking over more locations than to concentrate it in one spot. This increases the likelihood that the new spaces are well used. There is a small cost advantage, in terms of cost per additional space, for building a 2-level structure compared to two single-level structures. However, if the extra level is not used efficiently, such an advantage becomes irrelevant.

Of the five parking lots on the west side of State Street, all are sufficiently large to have second levels added. However, Lot #1 is substantially smaller than the other four, and it was eliminated as a possibility. Lot #5 is also a less desirable candidate because it is not centrally located. The remaining three lots have roughly the same usage per space and there is no clear reason based on the existing data discussed in Chapter 2 for preferring one over the other. The following table estimates the costs of decking each lot and the number of additional spaces that can be provided. Costs are based on a total construction cost of $22 per square foot. An average of 375 square feet is assumed to be required per parking space, which include space required for ramps and aisles.

Lot	Area (sq.ft.)	Cost to Add Deck	Existing Spaces (after Restriping)	Spaces with Deck	Additional Spaces	Cost/ Additional Space
2	60,000	$1,320,000	194	320	126	$10,476
3	64,000	$1,408,000	176	342	166	$ 8,481
4	44,000	$ 968,000	116	240	124	$ 7,806

Long-Term (Employee) Parking Expansion

Short-term parking demand must be addressed by providing parking close to people's destinations. Otherwise, shoppers will drive to outlying shopping malls where more convenient parking is available. However, the excess employee demand may be dealt with through several different options. Basically, employees can be allowed to continue to park in adjacent residential areas, fringe and peripheral parking facilities (with or without shuttle bus service) can be provided, and additional parking in the core area itself can be provided. Some combination of these options is of course possible, and the need for each will be greatly affected by whether a residential permit parking program is implemented in the areas surrounding the Downtown core, as has been proposed in recent years. The 1979 Transportation Management Implementation Study estimated that 2,050 employees parked their cars on unrestricted streets adjacent to the CBD. The field occupancy data suggest that this overstates the actual usage, which is probably between 1,000 and 1,500 cars. Still, this would be a tremendous number of cars to have to find alternative parking for in the event that a residential permit program were implemented.

Alternatives Without a Residential Permit Program

If the status quo is continued and employees continue to park in residential areas, the peripheral parking concept will probably not be viable because it will offer little or no time advantage over parking 4 or 5 blocks away and walking to work. The time required to drive to the peripheral lot (if out of one's way), wait for the shuttle bus, ride the bus, and then walk from the shuttle bus to one's workplace, would in most cases exceed the time required to walk to Downtown from an adjacent residential street. Any charge for parking and the shuttle would further discourage use. The peripheral lot concept is most successful in larger CBD's where one must

generally park more than a half-mile away from work. Providing fringe lots from which people can walk to work would be very expensive and would also offer employees no advantage over parking on residential streets.

Providing additional employee parking in the central core will help the situation if it is reasonably priced. At the current $60/month rate, there will be relatively few employees who will opt to purchase a space instead of parking for free and walking, or purchasing a private space one or two blocks away. At $30/month, the current market rate, many of those who park in private lots would switch to the more centrally-located public facilities, and some residential area parkers would also switch to the City lots for convenience. At lower rates, increasingly more employees would be willing to park, and at $10 or $15 per month, most of the 1,000 to 1,500 persons who park in residential areas would be signing up. Thus, the need for additional employee parking in the central core depends greatly on how much is charged for parking. How much is charged also affects how costly the parking will be to the Parking District.

In the previous section, the cost per additional space was estimated to be between $7,800 and $10,500 for the three lots. With higher structures, which would be appropriate of employee parking is being added, these costs would drop somewhat. Using an average figure of $8,000, the annual amortized cost per space (assuming a 25-year life @ 10% interest) is about $880. Operations and maintenance would add about $300 per space. User fees of $60/month amount to $720, while a $30 monthly charge covers only 30% of the cost. A $15 fee covers only 15%. At low monthly rates, the demand for spaces as well as the net deficit per space is very large, resulting in an enormous total cost to the Parking District. (For example, if $15 per month is charged, and 800 employee parking spaces are provided, the annual cost to the Parking District would be about $800,000.)

Thus, the decision regarding how much employee parking should be provided in the Downtown area cannot just be based

on "need" but depends upon policy decisions regarding how much of the parking cost employees should be made to pay, how much the District (and the businesses which support it) are willing to spend on employee parking and how much of the employee parking in residential areas should be eliminated. This last question inevitably leads to the residential parking permit issue.

Alternatives with a Residential Parking Program

If a residential permit program is implemented in which parking by non-residents is limited to around two hours, the thousand or more employees parking on residential streets will be forced to park elsewhere. Without any alternative being provided, most would probably park in short-term spaces and move their cars three times a day, as many employees already do. This would seriously overload the available short-term parking and would be a very undesirable result. In time, the market value of Downtown parking would rise, and private property owners would probably develop more parking spaces. However, the short-term impacts could be disastrous, forcing many businesses to flee Downtown. For a residential parking permit program to work, some alternative parking arrangement must be provided.

With a residential permit program eliminating free parking in residential areas, a peripheral parking lot/shuttle bus program would be viable. The 1979 Transportation Management Implementation Study examined several plans and estimated costs. Increasing those costs to account for inflation, the annual costs per space of building a fringe lot and operating bus service are still below what is estimated for decking existing lots in the CBD or constructing new fringe lots. However, higher user fees could be charged for parking in the CBD, which would cancel out much of the cost advantage of the periheral lot/shuttle service from the District's perspective. The peripheral lot concept is most cost-effective if existing parking lots are used. The 1979 study recommended trying to lease usage of four church parking lots on Anacapa and Santa Barbara Streets, and using existing waterfront lots.

This would make the concept very advantageous over additional Downtown parking from a cost perspective, although it would also be perceived as much more inconvenient.

One option that can be implemented along with the residential permit plan is to allow employees to park all day if they buy a special monthly permit. This could be priced at around $10 per month, which would be cheaper than parking in the CBD core, (assuming public facility rates were equal to or higher than monthly rates in private lots), but more expensive than a peripheral parking lot, which is assumed to be free or at some nominal fee to encourage usage. The advantage of such a plan is that it allows for some usage of the residential parking areas by employees, thereby reducing the amount of new parking that must be provided, while permitting the City to control the level of usage and encroachment by regulating the number of permits sold and the fees charged. A second advantage is that it would raise additional revenue that can be used to pay for additional CBD parking and/or peripheral lot parking and shuttle bus operation. For example, 600 $10/month permits sold each month would reduce the number of employees parking in residential areas by about half and would generate $72,000 per year in revenue. If 400 additional employee parking spaces were then provided in the Downtown area at $40/month the net cost to the District would be only about $210,000 per year (400 spaces x [$1,180/space - $480/space revenue] - $72,000).

Summary

The previous discussions outlined some of the expansion policy options available to the Parking District and their implications. The District should move ahead with plans to install an additional level on either Parking lot 2, 3, or 4, to be used for short-term parking. The current data suggest that

more than one additional level is needed, but the District may wish to be prudent and construct only one level and reevaluate the parking situation after it is constructed and the currently programmed restriping and expansion plans are implemented. The choice of which lot to deck first should probably be made after preliminary architectural designs are completed for each site, and each site can be evaluated in terms of aesthetic considerations, and the cost per additional space. All designs should allow for the feasibility of eventually adding a third level.

The addition of new parking will probably attract additional traffic to Downtown Santa Barbara, given the current low ratio of parking to commercial floor space. Assuming that the turnover rate in the new parking area is eight per day, and that 50% of these trips are new trips to Downtown Santa Barbara, then each additional parking space would generate eight additional Downtown trips. Additional parking for 140 cars (a second level on an existing lot) would thus generate about 1120 daily trips, or about 1/2% of the current daily Downtown trip total. Thus, overall Downtown traffic could be expected to increase by 1/2% if a second level for short-term parking is installed on Parking Lots 2, 3 or 4.

While these trips are relatively insignificant on an area-wide basis, the increase in traffic adjacent to the parking facility could be significant. If an additional parking level were installed on Parking Lots 2, 3 or 4 almost all of the additional traffic would use Chapala Street. During the peak hour, the traffic volume on Chapala Street would increase by about 50 cars. Most of the Chapala Street intersection will be able to handle the additional traffic with the important exception of the Carrillo Street intersection. This intersection is projected to be the most congested intersection in the study area, and the additional traffic due to the parking expansion lot will increase traffic

on Chapala by about 2% at this point, further exacerbating the situation at the intersection.

Recommendations regarding parking expansion to accommodate employee parking demand cannot be made conclusively until two major policy decisions are made by the City or the Parking District. First, a decision regarding a residential parking permit program for the surrounding neighborhoods must be made, since this will greatly affect the need for additional parking. If a residential permit program is adopted, however, a limited number of permits for employees should be sold so that this valuable street space is used more intensively than if only residents were using the spaces, while still improving overall space availability for residents. Second, the District must determine to what extent it is willing to subsidize the cost of employee parking. If the existing policy of making monthly parkers pay the full cost of parking is continued, there is little need for additional parking since few employees would be willing to pay full-cost rates, especially if parking for free in residential areas remains an option. As the user price drops, however, the amount of new parking required will increase.

FINANCING

Although it is not yet clear as to exactly how much additional parking the Parking District should be providing in Downtown Santa Barbara, some immediate expansion for short-term parkers is warranted. In this section, the District's cash flow through 1991 is projected based on current operations, facilities, and capital improvement plans. This is then analyzed to determine the ability of the District to finance future expansions.

Any projection of cash flow is laden with assumptions regarding future trends for revenues, costs, and interest rates.

No reputable economist is comfortable predicting what the inflation and credit market rates will be one year from now let alone ten years later. The assumptions that we have used are slightly conservative from the District's perspective (i.e., costs are projected to grow at slightly higher rates than revenues.) In general, a 10% inflation rate has been assumed for future costs.

A summary table outlining the District's cash flow through 1990 is shown in Table 15. Each of the line items and the assumptions behind the projections are discussed in the following two major sections.

Parking District Revenues

The Parking District derives its revenues from three principal sources: an ad valorem assessed levied on properties in the District, a Parking and Business Improvement Assessment levied on businesses within the District, and user fees from the parking facilities. Smaller amounts of revenues are derived from interest obtained from the District's capital fund, and lease revenues.

Ad Valorem Assessment

Ad valorem assessments comprise the single largest source of revenue for the Parking District, amounting to $595,000 in fiscal year 1979-80, and about $700,000 in 1980-81. The basic assessment rate is $6.20 per $100 assessed valuation, having been lowered in 1979 from $7.20 per $100, the applicable rate since 1971. Beginning in 1981-82, properties will be valued at full market value rather than at 25% of value, so the assessment rate will be $1.55 per $100 assessed valuation.

Several basic adjustments are made to the assessment for each individual property. First, a property's assessed valuation is divided into assessments for the land and the improvements on the land. Parking credits are then given for any parking provided, according to the following formulas:

Table 15

Parking District Cash Flow Through 1990
(Thousands of Dollars)

	Actual		Estimates									
	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
REVENUES												
Ad Valorem Tax	639	595	700	756	816	882	952	1028	1110	1200	1296	1399
Parking and Business Improvement Tax	352	392	415	440	467	495	525	556	589	625	662	702
User Fees												
Hourly	304	359	400	400	400	400	400	480	480	480	480	480
Monthly	84	74	55	55	55	55	55	66	66	66	66	66
Leases	21	57	74	81	90	98	108	119	131	144	159	174
Interest on Investments	50	136	175	230	215	250	274	363	476	606	747	907
Other	22	15	10	10	10	10	10	10	10	10	10	10
Total Revenues	1472	1628	1829	1972	205	2190	2324	2622	2862	3132	3420	3738
EXPENSES												
Labor	260	285	333	375	413	545	499	549	604	664	731	804
Materials	225	271	335	343	377	415	457	502	552	608	668	735
Capital Projects	20	--	80	750	350	500	--	--	--	--	--	--
Debt Service	620	624	623	623	623	625	625	625	625	682	695	712
Total Expenses	1125	1180	1371	2091	1763	1994	1581	1676	1781	1954	2094	2251
NET INCOME	347	448	458	-119	290	196	743	946	1081	1178	1326	1487
CAPITAL FUND BALANCE	NA	1456	1914	1795	2085	2281	3024	3970	5051	6229	7555	9042
Required Debt Service Reserve	378	378	378	378	378	378	378	378	378	378	378	378
CAPITAL IMPROVEMENT RESERVE	NA	1078	1536	1417	1707	1903	2646	3592	4673	5851	7177	8664

Land assessment credit = .75 (Area of parking lot/Total land area)

Improvements assessment credit = .75 (Area of parking lot/ Gross floor area)

A property's taxes are then reduced by the amount obtained through multiplication by these credits.

Each property is also assigned a zone of benefit based on how far a property is from the nearest parking facility, taking into account walking routes and streets to be crossed. Those properties on the same block as a parking facility have a 100% zone of benefit, while those on adjacent blocks have zones of benefit ranging from 40% to 2%. The nominal assessment fees are multiplied by a property's zone of benefit to obtain the actual assessment fee. An example for a full determination of a property's assessment is shown in Table 16.

In fiscal year 1980-81, ad valorem taxes for the Parking District will total about $700,000. The Jarvis-Gann Property Tax initiative limits the annual increases in assessed valuation to 2% unless a property is sold. Therefore, growth in ad valorem taxes are assumed to grow at slightly under the rate of inflation, even though Downtown property values are likely to increase faster than the overall inflation rate. In projecting future years' revenue, an 8% growth factor from the 1980-81 base has been assumed. While the increase from 1979-80 to 1980-81 was more than double this, the lower rate has been assumed in order to be conservative.

Parking and Business Improvement Assessments

From 1964 to 1970, the City's parking facilities charged for all short-term parking. This was then changed to the current system of 90-minute free parking, causing a substantial loss

TABLE 16

EXAMPLE OF PARKING ASSESSMENT CALCULATIONS

Example: Parcel X consists of the following:

Land Area	95,000 sq.ft.
Building Gross Floor Area	65,000 sq.ft.
Parking Lot Area	30,000 sq.ft.
Assessed Valuation of Land	$300,000
Assessed Valuation of Improvments	$100,000
ZONE OF BENEFIT	35%

The Parking Credit is derived by the following calculations:

Parking Area / Land Area	30,000 / 95,000	x	.75	= .24	Parking Credit For Land
Parking Area / Gross Floor Area	30,000 / 65,000	x	.75	= .35	Parking Credit For Improvements

Land Parking Credit	1.00 - .24	Improvements Parking Credit	1.00 - .35
CREDIT FACTOR	.76	CREDIT FACTOR	.65

The maximum parking credit that may be allowed on either land or improvements is 75%.

The Ad Valorem Assessment is calculated as follows:

Assessed Valuation of Land		Assessment Rate		Zone of Benefit		Parking Credit Factor		Land Assessment
$300,000	÷ 100 x	1.55	x	.35	x	.76	=	$1,236.90

Assessed Valuation of Improvements		Assessment Rate		Zone of Benefit		Parking Credit Factor		Improvement Assessment
$100,000	÷ 100 x	1.55	x	.35	x	.65	=	$352.60

Land Assessment	$1,236.90
Improvements Assessment	352.60
Total Ad Valorem Assessment	$1,589.50

of revenue. To make up for this loss, a Parking and Business Improvement Assessment was established. This assessment is levied on all businesses in the Parking District in a zone of benefit of 20% or higher. The assessment rates applied vary by type of business and are as follows:

Type of Business	Category	Rate
Retailer/Wholesaler	Avg. sale less than $20	65¢/$100 gross sales
	Avg. sale between $20 and $100	65¢/$100 gross sales
	Avg. sale over $100	34¢/$100 gross sales
		19¢/$100 gross sales
Savings & Loan Assoc.	-	$38/$1 mil. of deposits
Stock and bond brokers	-	$95/broker
Professional offices	-	$38/professional employee +$19/ non-professional employee
Theaters & bus depots	-	7¢/square foot
All others	-	22¢/square foot

As with the ad valorem assessment, a business' assesment are reduced according to its zone of benefit and its parking credit factors.

In 1979-80, the Parking and Business Improvement tax generated $391,933, of which about two-thirds come from the retail/wholesale category. This will probably grow at less than the rate of inflation because as average retail sales prices increases, some stores will get dropped into a lower tax rate. Also, other rates are based on the number of employees or gross floor area and will grow only as the real value of Downtown economic activity grows, which will probably not exceed 1 or 2% per year. Therefore, growth in the Parking and Business Improvement Tax is projected to be 6% per year.

User Fees

Parking user fees grew substantially in 1979-80 following the change in rate structure on March 1, 1979. Hourly fees are projected to remain constant over the next four years, at which time a 20% increase is assumed based on 25-50% step increases in fees at that time, making up for inflation (overtime would rise to 75¢ and $1.25/hour). Monthly permit fees are assumed to also remain constant through 1985, followed by a 20% increase at that time.

Interest on Investments

As income has exceeded expenditures over the past few years, the Parking District has been able to accumulate a working capital fund that can be invested in interest-bearing accounts. A 12% average rate of return is assumed for these investments, slightly above the projected inflation rate.

Leases

The Parking District receives lease revenues from the commercial floor space on the ground floor of Parking Facility # 9. These revenues are projected to increase by 10% a year.

Other Revenues

Other revenues from special events and other sources are minimal, and a constant $10,000 annual amount has been assumed.

EXPENSES

The Parking District has four basic categories of expenses, each described on the next page.

Labor

The Parking District employs ten full-time employees and about 40 part-time employees. The ten full-time employees include four persons in administration and accounting, and six field persons who do maintenance and operations. The forty part-time employees operate the parking lot kiosks and help in maintenance. Costs are projected to be $375,000 in 1981-82 and are projected to increase by 10% per year thereafter.

Materials, Supplies and Services

These costs totaled $271,000 in 1979-80, were abnormally high in 1980-81, and are projected to total $343,000 in 1981-82. A 10% annual increase is projected.

Capital Projects

Capital projects have been negligible over the last few years, but the Parking District has $1,600,000 worth of capital projects programmed for the next three years. These include:

Fiscal Year 1981-82

Lot 1 Expansion	$ 400,000
Lot 1 Redesign	40,000
Lot 5 Land Acquisition	100,000
Lot 6 Reconstruction	180,000
Lot 9 Landscaping	10,000
Revenue Control System	20,000
	$ 750,000

Fiscal Year 1982-83

Lot 1 Reconstruction	$ 300,000
Lot 2 Redesign	50,000
	$ 350,000

Fiscal Year 1983-84

Lot 2 Reconstruction	$ 500,000
TOTAL	$1,600,000

No additional capital projects in later years has been assumed.

Debt Service

The Parking District is currently paying off two long-term bonds. The first of these will mature in 1990, the second in 1999. The annual payments will remain fairly constant at around $625,000 through 1986-87. They will then average about $696,000 for the next three years as the principal of the first bond is paid out. Annual payments in the 1990's will then drop to around $550,000.

RESULTS

The cash flow projection shown in Table 6 shows that revenues will greatly outpace expenses over the next ten years. In the last three years (through 1980-81), net income has averaged over $400,000 per year. While this will decrease significantly during the next three years as various capital improvement projects are implemented, income in 1984-85 is projected at over $700,000, and is projected to exceed $900,000 thereafter following a modest increase in parking fees in 1985. By 1990, an unrestricted capital improvement reserve of $8.6 million is projected.

The District's phenomenal growth in projected income is in spite of a larger projected increase in operating expenses relative to revenues (1989-90 operating expenses--labor & materials--are projected to be 130% above 1980-81 levels while total revenues are expected to rise by only 104%). However, the District's

debt service will basically remain constant, and will account for only a third of all costs by 1990, and still less after that when one bond will have been totally repaid. In this way, the District benefits from inflation since a major cost component stays constant while revenues rise. If the basic inflation rate is only 5% rather than 10%, net income and the capital improvement reserve in 1990 will be about half of what is projected. (Of course, these dollars in 1990 would then be worth more in real terms, largely making up for the reduced total amount.)

In any case, and even allowing for considerable variation in assumptions, it is clear that the Parking District will have a sizable income and capital reserve fund available to finance necessary improvements. In a previous section, the amortized capital cost per additional space was estimated to be about $900, based on a 25-year bond at 10% interest. Operating costs would add about $300, which would rise with inflation. The $8,664,000 capital improvement reserve projected for 1990 could support additional annual expenditures of around $650,000 between 1982 and 1990 before being depleted (assuming an interest/inflation rate of 10%). This would pay for about 500 additional parking spaces, excluding any additional revenues from the spaces. And income after 1990 will be over $1.5 million a year, guaranteeing the ability to continue adequate financial support after that time.

Thus, projected income based on existing revenue sources is high enough to support a major Downtown parking expansion program. In fact, a more likely modest expansion program that added two to three hundred spaces would leave the District with a continuing high income such that there may be pressure to reduce further the assessments levied on local businesses and/or the fees charged for parking.

APPENDIX A. VOLUME/CAPACITY RATIOS FOR ADDITIONAL SCENARIOS

Table A-1 includes calculated volume/capacity ratios for Downtown intersections under a variety of 1985 and 1995 conditions. The "base" condition excludes the opening of the hotel/conference center or any new department stores. Other scenarios examined include only the hotel/conference center being built, only two department stores, the hotel/conference center and two department stores, and the four scenarios discussed in the main report.

The calculations shown in Table A-1 were made by City staff. Some of the results differ slightly from those reported in the main report due to rounding and different methodology assumptions.

Table A-1

VOLUME/CAPACITY RATIOS FOR VARIOUS SCENARIOS

INTERSECTION	1981 BASE	1985 BASE	1985 HOTEL	1985 2 STORES	1985 HOTEL & 2 STORES	Scenario #1 1985 HOTEL & 3 STORES	1995 BASE	1995 HOTEL	1995 2 STORES	1995 HOTEL & 2 STORES	Scenario #3 1995 HOTEL & 3 STORES	Scenario #4	Scenario #6
ANACAPA/ANAPAMU	.49	.53	.53	.60	.60	.59	.61	.61	.68	.68	.67	.67	.67
ANACAPA/CANON PERDIDO	.48	.52	.52	.55	.56	.57	.59	.59	.63	.63	.64	.55	.49
ANACAPA/CARRILLO	.61	.65	.66	.69	.69	.71	.75	.79	.81	.81	.83	.85	.83
ANACAPA/COTA	.45	.48	.49	.52	.52	.53	.55	.56	.60	.60	.60	.60	.48
ANACAPA/DE LA GUERRA	.49	.53	.53	.56	.56	.58	.60	.60	.64	.64	.65	.70	.61
ANACAPA/FIGUEROA	.31	.33	.33	.36	.37	.37	.38	.38	.42	.42	.42	.42	.42
ANACAPA/HALEY	.62	.67	.68	.70	.71	.73	.76	.77	.80	.81	.82	.82	.68
ANACAPA/MICHELTORENA	.32	.35	.35	.37	.37	.38	.40	.40	.43	.43	.43	.43	.43
ANACAPA/ORTEGA	.36	.38	.38	.42	.42	.43	.44	.44	.48	.48	.49	.49	.38
ANACAPA/VICTORIA	.37	.38	.39	.44	.45	.45	.44	.45	.50	.51	.51	.55	.55
ANAPAMU/CHAPALA	.35	.38	.39	.44	.45	.45	.44	.45	.50	.51	.51	.53	.53
ANAPAMU/DE LA VINA	.34	.37	.38	.44	.45	.45	.42	.44	.50	.51	.51	.50	.50
ANAPAMU/GARDEN	.43	.47	.47	.47	.47	.47	.54	.54	.54	.54	.54	.69	.69
ANAPAMU/SANTA BARBARA	.51	.55	.55	.59	.59	.59	.63	.63	.68	.68	.67	.49	.49
ANAPAMU/STATE	.65	.70	.70	.77	.77	.77	.81	.81	.88	.89	.87	.95	.95
BATH/CARRILLO *	.68	.73	.75	.75	.77	.80	.84	.86	.86	.88	.91	.91	.91
BATH/HALEY	.76	.82	.83	.83	.84	.84	.93	.94	.95	.96	.96	.96	1.03
BATH/MICHELTORENA	.40	.43	.44	.44	.44	.46	.50	.50	.50	.51	.51	.51	.51
BATH/MISSION	.51	.55	.55	.56	.56	.57	.64	.62	.64	.64	.66	.66	.66
CANON PERDIDO/CHAPALA	.37	.40	.41	.42	.43	.45	.46	.47	.48	.49	.50	.55	.56
CANON PERDIDO/ST BARB	.45	.48	.50	.52	.52	.51	.56	.57	.59(1)	.60	.59	--	--
CANON PERDIDO/STATE	.54	.58	.59	.59	.60	.60	.66	.67	.67	.68	.68	.72	.71
CARRILLO/101 NB	.59	.63	.64	.65	.66	.67	.73	.74	.75	.76	.76	.76	.76
CARRILLO/101 SB	.64	.68	.71	.72	.74	.76	.79	.81	.82	.85	.86	.86	.86
CARRILLO/CASTILLO *	.60	.65	.67	.68	.71	.72	.75	.77	.78	.81	.82	.82	.82
CARRILLO/CHAPALA	.66	.72	.83	.79	.91	1.00	.82	.94	.90	1.02	1.10	1.15	1.16
CARRILLO/DE LA VINA	.46	.49	.57	.56	.58	.64	.56	.66	.64	.67	.71	.71	.72
CARRILLO/SANTA BARBARA	.58	.62	.63	.64	.65	.67	.71	.72	.74	.75	.76	.49	.49
CARRILLO/STATE	.39	.42	.43	.44	.45	.46	.49	.49	.50	.51	.52	.61	.60
CASTILLO/101 SB *	.71	.76	.76	.77	.77	.77	.87	.87	.87	.88	.88	.88	.89

Table A-1 (continued)

VOLUME/CAPACITY RATIOS FOR VARIOUS SCENARIOS

INTERSECTION	1981 BASE	1985 BASE	1985 HOTEL	1985 2 STORES	1985 HOTEL & 2 STORES	1985 Scenario #1 HOTEL & 3 STORES	1995 BASE	1995 HOTEL	1995 2 STORES	1995 HOTEL & 2 STORES	1995 Scenario #3 HOTEL & 3 STORES	Scenario #4	Scenario #6
CASTILLO/HALEY	.67	.72	.72	.72	.72	.72	.82	.82	.82	.82	.82	.82	.91
CASTILLO/MICHELTORENA	.49	.53	.53	.53	.53	.53	.62	.62	.62	.62	.62	.62	.62
CASTILLO/MISSION	.47	.51	.51	.51	.51	.51	.59	.59	.59	.59	.59	.59	.59
CHAPALA/COTA	.60	.64	.66	.66	.68	.69	.73	.75	.75	.77	.80	.84	.86
CHAPALA/DE LA GUERRA	.29	.31	.33	.33	.34	.36	.36	.37	.38	.39	.40	.44	.45
CHAPALA/FIGUEROA	.31	.33	.34	.37	.38	.43	.38	.39	.43	.44	.48	.45	.45
CHAPALA/HALEY	.55	.59	.63	.61	.65	.65	.68	.72	.70	.74	.74	.76	.77
CHAPALA/MICHELTORENA	.46	.50	.51	.56	.58	.59	.58	.60	.65	.66	.67	.69	.69
CHAPALA/MISSION	.64	.69	.71	.72	.74	.76	.80	.82	.83	.86	.87	.88	.88
CHAPALA/ORTEGA	.44	.47	.49	.49	.51	.53	.53	.55	.56	.58	.59	.64	.67
CHAPALA/VICTORIA	.40	.43	.45	.52	.54	.53	.50	.51	.57	.61	.59	.63	.63
COTA/SANTA BARBARA	.50	.54	.54	.56	.56	.56	.61	.62	.64	.64	.63	.43	.41
COTA/STATE	.69	.74	.74	.74	.74	.75	.84	.84	.84	.84	.85	.93	.91
DE LA GUERRA/ST BARB	.42	.45	.45	.47	.47	.47	.51	.51	.53	.54	.54	.43	.42
DE LA GUERRA/STATE	.35	.37	.38	.38	.38	.38	.43	.43	.43	.43	.43	.52	.50
DE LA VINA/HALEY	.42	.45	.48	.45	.48	.46	.51	.54	.52	.55	.54	.54	.54
DE LA VINA/MICHELTORENA	.48	.52	.54	.55	.56	.58	.61	.62	.64	.65	.66	.66	.66
DE LA VINA/MISSION	.67	.73	.74	.76	.78	.80	.84	.86	.88	.90	.92	.92	.92
FIGUEROA/SANTA BARBARA	.35	.37	.38	.41	.41	.41	.43	.43	.47	.47	.46	.20	.20
FIGUEROA/STATE	.41	.44	.44	.46	.46	.48	.50	.51	.52	.52	.54	.61	.60
HALEY/SANTA BARBARA	.69	.74	.75	.79	.80	.80	.85	.86	.90	.92	.91	.77	.74
HALEY/STATE	.67	.71	.72	.73	.74	.75	.71	.83	.83	.85	.82	.82	.88
MICHELTORENA/ST BARB	.50	.54	.54	.54	.55	.55	.62	.62	.63	.63	.63	.52	.52
MICHELTORENA/STATE	.60	.65	.65	.65	.66	.66	.76	.76	.76	.76	.76	.80	.80
MISSION/101 NB	.61	.66	.66	.68	.68	.68	.76	.76	.78	.78	.81	.65	.65
MISSION/101 SB	.53	.57	.57	.59	.59	.59	.66	.66	.68	.68	.68	.68	.68
MISSION/STATE	.68	.73	.74	.78	.78	.79	.85	.86	.90	.91	.97	.68	.68
ORTEGA/STATE	.45	.48	.48	.48	.48	.49	.55	.55	.55	.55	.56	.65	.61

Table A-1 (continued)

VOLUME/CAPACITY RATIOS FOR VARIOUS SCENARIOS

INTERSECTION	1981 BASE	1985 BASE	Scenario #1 1985 HOTEL	2 STORES	HOTEL & 2 STORES	HOTEL & 3 STORES	1995 BASE	Scenario #3 1995 HOTEL	2 STORES	HOTEL & 2 STORES	HOTEL & 3 STORES	Scenario #4	Scenario #6
SANTA BARBARA/VICTORIA	.37	.39	.40	.43	.43	.44	.45	.45	.49	.50	.49	.31	.31
STATE/VALERIO	.44	.48	.48	.48	.48	.48	.55	.56	.56	.56	.55	.58	.58
STATE/VICTORIA	.58	.63	.63	.66	.67	.67	.72	.72	.76	.76	.76	.82	.82

Note: Some of the calculated V/C ratios differ slightly from those reported in the main report due to rounding and different methodology assumptions.

APPENDIX B

VOLUME/CAPACITY RATIOS FOR THE AVERAGE FRIDAY PM PEAK HOUR

Table B-1 includes calculated volume/capacity ratios for the Average Friday PM Peak Hour under a variety of 1985 and 1995 conditions. The "base" condition excludes the opening of the hotel/conference center or any new department stores.

The calculation shown in Table B-1 were made by City staff. In general, the Friday peak hour volume/capacity ratios are about 5% higher than for the average weekday peak hour ratios.

TABLE B-1
VOLUME/CAPACITY RATIOS FOR VARIOUS SCENARIOS
AVERAGE FRIDAY PM PEAK HOUR

INTERSECTION	1981 BASE	1985 BASE	HOTEL	2 STORES	HOTEL & 2 STORES	1995 BASE	HOTEL	2 STORES	HOTEL & 2 STORES
ANACAPA/ANAPAMU	.52	.56	.56	.63	.63	.64	.64	.71	.71
ANACAPA/CANON PERDIDO	.51	.54	.54	.58	.58	.62	.62	.66	.66
ANACAPA/CARRILLO	.67	.72	.73	.76	.77	.83	.84	.87	.88
ANACAPA/COTA	.47	.51	.51	.54	.54	.58	.58	.62	.62
ANACAPA/DE LA GUERRA	.52	.55	.55	.59	.59	.63	.63	.67	.67
ANACPA/FIGUEROA	.32	.35	.35	.38	.38	.40	.40	.44	.44
ANACAPA/HALEY	.65	.70	.71	.73	.75	.80	.81	.84	.85
ANACAPA/MICHELTORENA	.34	.36	.37	.39	.39	.42	.42	.45	.45
ANACAPA/ORTEGA	.37	.40	.40	.44	.44	.46	.46	.50	.50
ANACAPA/VICTORIA	.39	.42	.42	.51	.52	.48	.48	.59	.59
ANAPAMU/CHAPALA	.37	.40	.41	.46	.47	.46	.47	.53	.54
ANAPAMU/DE LA VINA	.36	.39	.40	.44	.45	.44	.46	.53	.54
ANAPAMU/GARDEN	.46	.49	.49	.49	.49	.56	.56	.56	.56
ANAPAMU/SANTA BARBARA	.54	.58	.58	.62	.62	.66	.67	.71	.71
ANAPAMU/STATE	.69	.74	.74	.81	.81	.85	.85	.92	.93
BATH/CARRILLO (1)	.67	.72	.75	.74	.77	.83	.86	.85	.88
BATH/HALEY (1)	.43	.46	.47	.47	.47	.53	.53	.54	.54
BATH/MICHELTORENA (1)	.19	.20	.21	.21	.21	.24	.24	.24	.24
BATH/MISSION (1)	.48	.52	.52	.54	.54	.60	.60	.62	.62
CANON PERDIDO/CHAPALA	.39	.42	.43	.44	.45	.48	.50	.50	.51
CANON PERDIDO/ST BARB.	.49	.52	.52	.55	.55	.60	.60	.62	.62
CANON PERDIDO/STATE	.57	.61	.62	.62	.63	.70	.70	.71	.71
CARRILLO/101 NB	.62	.67	.67	.68	.69	.76	.77	.78	.79
CARRILLO/101 SB	.67	.72	.74	.75	.77	.82	.85	.86	.89
CARRILLO/CASTILLO (1)	.49	.52	.54	.55	.58	.60	.63	.64	.66
CARRILLO/CHAPALA	.70	.76	.87	.83	.96	.86	.98	.94	1.06
CARRILLO/DE LA VINA	.48	.52	.59	.53	.61	.59	.67	.61	.69
CARRILLO/SANTA BARBARA	.65	.70	.71	.74	.75	.81	.81	.85	.86
CARRILLO/STATE	.41	.44	.45	.46	.47	.51	.52	.52	.53
CASTILLO/101 SB	.75	.80	.80	.83	.83	.91	.91	.92	.92
CASTILLO/HALEY (1)	.70	.75	.75	.75	.75	.85	.85	.85	.85
CASTILLO/MICHELTORENA(1)	.47	.51	.51	.51	.51	.59	.59	.59	.59
CASTILLO/MISSION (1)	.45	.49	.49	.49	.49	.56	.56	.56	.56
CHAPALA/COTA	.64	.68	.70	.71	.72	.78	.80	.80	.83
CHAPALA/DE LA GUERRA	.30	.32	.33	.33	.35	.36	.38	.38	.39
CHAPALA/FIGUEROA	.32	.35	.36	.41	.42	.40	.41	.47	.48
CHAPALA/HALEY	.58	.63	.64	.65	.71	.71	.73	.74	.81

TERSECTION	1981 BASE	1985 BASE	HOTEL	2 STORES	HOTEL & 2 STORES	1995 BASE	HOTEL	2 STORES	HOTEL & 2 STORES
APALA/MICHELTORENA	.49	.53	.54	.59	.60	.61	.62	.68	.69
APALA/MISSION	.67	.72	.74	.75	.77	.84	.86	.87	.90
APALA/ORTEGA	.46	.49	.51	.51	.53	.56	.58	.58	.61
APALA/VICTORIA	.42	.45	.47	.54	.56	.52	.54	.62	.64
TA/SANTA BARBARA	.53	.57	.57	.59	.59	.64	.65	.67	.67
TA/STATE	.72	.78	.78	.78	.78	.89	.89	.89	.89
LA GUERRA/ST BARB.	.44	.47	.47	.49	.49	.54	.54	.56	.56
LA GUERRA/STATE	.37	.39	.40	.39	.40	.45	.45	.45	.45
LA VINA/HALEY	.41	.44	.47	.45	.48	.51	.54	.51	.55
LA VINA/MICHELTORENA	.51	.55	.56	.58	.59	.64	.65	.67	.68
LA VINA/MISSION	.70	.76	.78	.79	.81	.88	.90	.92	.94
GUEROA/SANTA BARBARA	.36	.39	.40	.43	.43	.45	.45	.49	.49
GUEROA/STATE	.43	.46	.46	.48	.48	.53	.53	.55	.55
LEY/SANTA BARBARA	.73	.78	.79	.83	.84	.89	.90	.95	.96
LEY/STATE	.70	.75	.76	.77	.78	.85	.87	.87	.89
CHELTORENA/ST BARB.	.52	.56	.56	.57	.57	.65	.65	.66	.66
CHELTORENA/STATE	.63	.69	.69	.69	.69	.79	.79	.80	.80
SSION/101 NB	.64	.69	.69	.71	.71	.80	.80	.82	.82
SSION/101 SB	.55	.60	.60	.62	.62	.70	.70	.71	.71
SSION/STATE	.71	.77	.78	.81	.82	.89	.90	.94	.95
TEGA/STATE	.47	.51	.51	.51	.51	.58	.58	.58	.58
NTA BARBARA/VICTORIA	.38	.41	.41	.45	.45	.47	.48	.52	.52
ATE/VALERIO	.46	.50	.50	.51	.51	.58	.58	.58	.59
ATE/VICTORIA	.55	.59	.59	.59	.59	.68	.68	.68	.68

) All calculations for Bath and Castillo Street intersections are based on one-way traffic flow and revised intersection geometrics.

APPENDIX C

RESPONSE TO COMMENTS REGARDING THE DRAFT REPORT

On January 12, 1982, the Public Works Department submitted comments to JHK & Associates regarding the Draft Report on the Downtown Retail Expansion Traffic & Parking Study. These comments reflected the concerns expressed by staff of the Public Works and Community Development Departments, and the City's Transportation and Parking Committees. Comments were divided into comments on "substantive issues" and "typographical and editorial comments." This appendix contains the substantive comments that were submitted and the consultant's response to these comments.

Comment: Staff's calculations of a "worst case" analysis are being forwarded under separate cover. It is requested that these calculations be included in an appendix to the report and that the appendix be referenced in the first page of the executive summary as the source for "worst case" calculations.

Response: See Appendix B

Comment: All of the costs associated with future improvements at the Highway 101 interchanges appear to be low. The addition of a third lane for $12,000 each at the off-ramps at Castillo and Carrillo Streets is not realistic, especially since the Castillo ramp is bounded by retaining walls. Those costs projected on pages 3-8, 3-10 and 3-15 should be justified if correct, or restated if incorrect.

Response: Appropriate revisions have been made in the report.

Comment: The discussion on page 5-13 relating to parking lot expansion does not take into account the localized traffic effects of the expansion of parking facilities. Although a second level on a parking lot may only generate a 1/2% increase in daily trips, those 1120 daily trips could have a significant impact on adjacent intersections and result in a reduced level of service.

Response: The referenced discussion has been expanded to include this issue. In particular, the Chapala/Carrillo street intersection is projected to be heavily congested in the future and traffic leading to an expanded parking facility along Chapala Street would worsen the situation. Other intersections along Chapala Street near the Parking District facilities will have ample capacity to accommodate additional traffic.

Comment: There is no discussion of the potential of an east-west couplet for reducing future traffic impacts. Some discussion of an east-west couplet or the creation of an east-west arterial should be included in the study analysis.

Response: A one-way couplet on Haley and Cota Streets would improve traffic on these streets significantly and would successfully mitigate many of the adverse conditions projected to occur in 1995 on these streets. The City's Public Works Department proposed making Haley and Cota Streets one-way in 1975, but the proposal was opposed by local merchants and rejected by the City Council. For this reason, alternative improvements to Haley Street were sought in this study.

Congestion on Mission and Carrillo Streets could also be mitigated by making these streets one-way westbound and Pedregosa and Canon Perdido Streets one-way eastbound east of Castillo Street. Eastbound traffic would use Castillo street for one block. These proposals would not help traffic at the Route 101 interchanges but could improve conditions in the center of Downtown. However, there are major problems with these proposals. First, Pedregosa is a residential street and making it a one-way thoroughfare would certainly arouse great opposition by residents. Second, Canon Perdido Street will be closed at Santa Barbara Street if the Presidio is restored. And finally, Castillo Street is due to become a one-way one-lane street so that a bicycle lane can be installed,; it would thus not be suitable for through traffic. In view of these problems, one-way couplets were not recommended.

Comment: Discussion should be included to indicate how the need for future traffic signals was predicted. Specifically, how is it that Sola Street will warrant future signals and Arrellaga Street will not?

Response: The need for future traffic signals was determined by estimating future traffic volumes at intersections without traffic signals, and comparing these volumes to the minimum volumes that warrant traffic signals, as specified in the FHWA's Manual on Uniform Traffic Control Devices. In most cases, the applicable warrant would be Warrant #2, Interruption of Continuous Traffic. This warrant is satisfied when for each of any 8 hours of an average day, the traffic volumes given in the following table exist on the major street and on the higher-volume minor-street approach to the intersection.

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)	Vehicles per hour on higher-volume minor-street approach (one direction only)
Major Street	Minor Street		
1	1	750	75
2 or more	1	900	75
2 or more	2 or more	900	100
1	2 or more	750	100

Regarding Arrellaga Street, a traffic signal at De La Vina and Arrellage Street may have to be installed, but other intersections along Arrellaga Street are not likely to have the required volumes.

Comment: There is a conflict between an intersection's level of service and the fact that a driver may have to stop at that intersection 70% to 80% of the time. How is this possible? Doesn't level of service and ease of traveling on a street system correlate?

Response: The simple answer to the last question is "not necessarily." In Downtown Santa Barbara, how often a driver has to stop at an intersection is usually a function of the signal timing rather than level of service. If there is poor timing coordination between signals on a street, a driver will have to stop frequently even if he is the only person driving on the street. Traffic signals in Downtown Santa Barbara are timed to give a good north-north progression, but east-west movement is sacrificed. This causes a high percentage of stops on the streets, regardless of the congestion level.

Comment: As a means of increasing the parking supply, there should be some discussion as to the removal of "T" markers. Since a 7% increase in Parking District spaces was achieved through restriping, how many more cars will be parked curbside by removal of existing "T" marks?

Response: On streets where curb parking spaces are designated, the City allows 24 feet of length per space. This is a typical length although many cities only allow 22 or 23 feet per spaces. It has been hypothesized that more parking could be provided by reducing this length or by removing the designation altogether and allowing cars to park freely. In large cities in which motorists are used to crowding into parking spaces, removing the space designations may result in more cars being able to park in a given block. However, in smaller cities in which motorists are accustomed to less crowded parking conditions, motorists are likely to leave about the same amount of space between cars when parking as is dictated by the current stall designations. Occasionally, motorists will leave excess space that wastes space. The City should do a field survey to determine the number of cars that are able to park on unmarked streets, and if significantly more cars are able to park than on streets with "T" markers, then the "T" markers should be eliminated.

Comment: The study does not answer the question of when it becomes uneconomical to provide more parking.

Response: All future parking that the City could provide would be uneconomical in the sense that user fees will not cover the full cost and Parking District funds will be required to subsidize the cost. The larger economic issue that examines the tradeoff between parking costs and Downtown business activity was beyond the scope of the study.

Comment: There is no discussion of controlling parking demand of employees by increasing user fees for parking. Could an increase in parking fees affect the demand for parking spaces by employees?

Response: The $60 monthly parking fee in City parking facilities is already very high and results in relatively little demand. (Only 75 monthly permits are sold each month.) These 75 users represent a very small fraction of the total employee parking demand and increasing the monthly parking fee would thus have a small

impact on overall demand. Most of those who would stop using the City parking facilities if a higher fee were imposed would pay for parking in a private parking lot where rates are already lower than what is charged in the City parking facilities.

Comment: In general, the report does not assess the impacts of affecting parking demand through the application of controlling the supply of parking or employing techniques to affect a change in the modal split. These areas should be addressed in the final report.

Response: In order to decrease the automobile mode share significantly, it will be necessary to decrease the supply of Downtown parking or increase parking costs. As was stated in the response to the previous comment, very few people pay to park all day in City parking facilities, so increasing rates will have very little overall impact. The implications of decreasing supply, by implementing a residential parking permit program, are discussed in the report.

U.C. BERKELEY LIBRARIES
C124891635